TECHNOLOGY DEPT.

Gas Journal

Vol. 264. 102nd Year. LONDON, DECEMBER 20, 1950. No. 4568. Price 1/-

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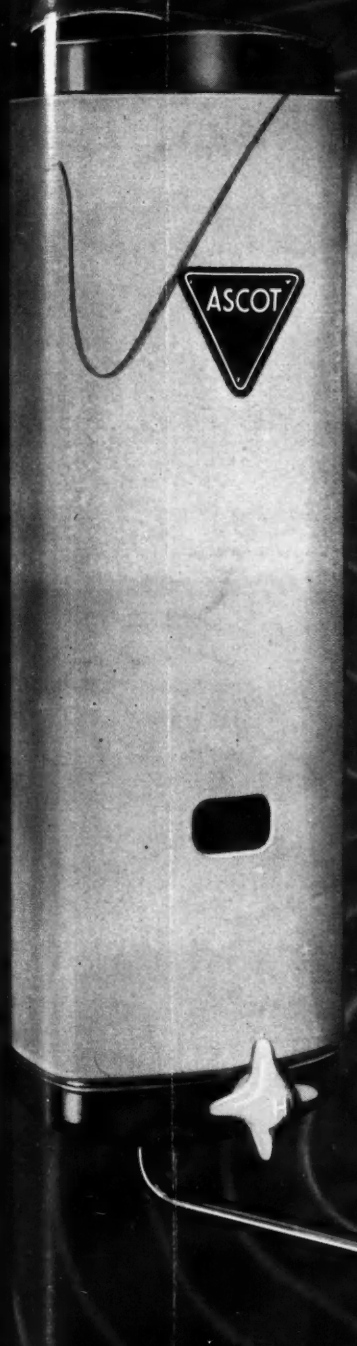

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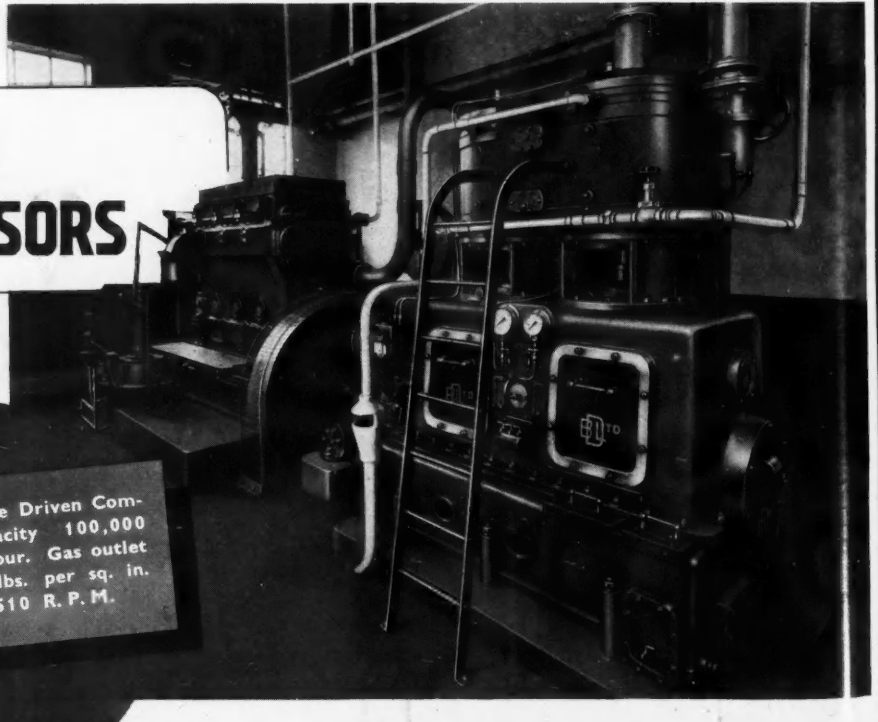

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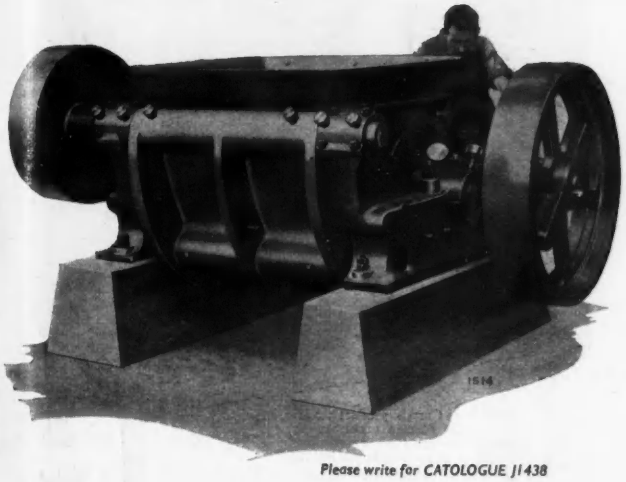

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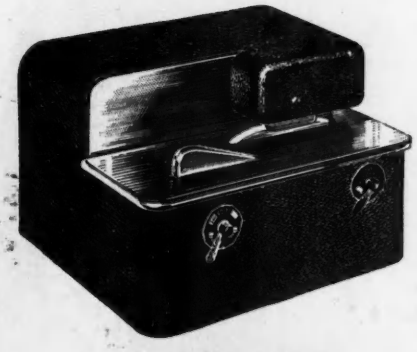

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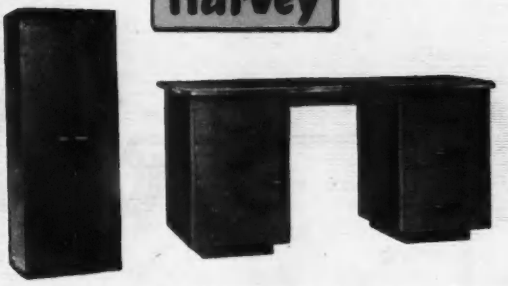

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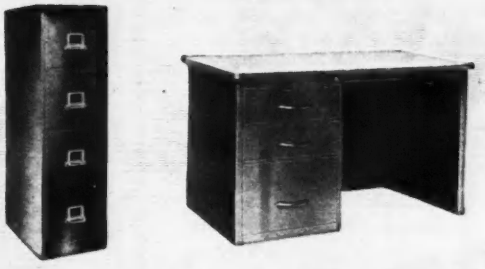

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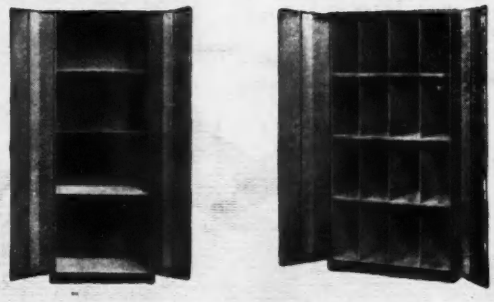

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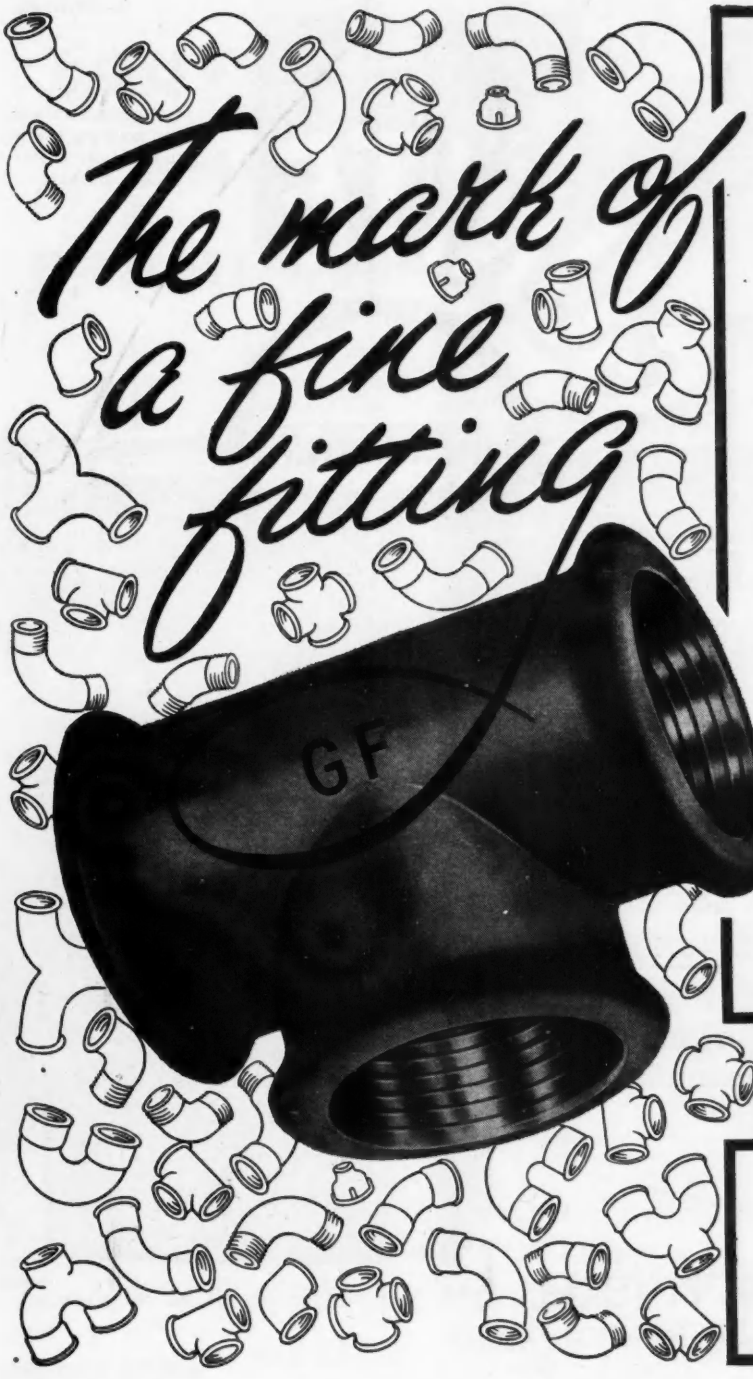

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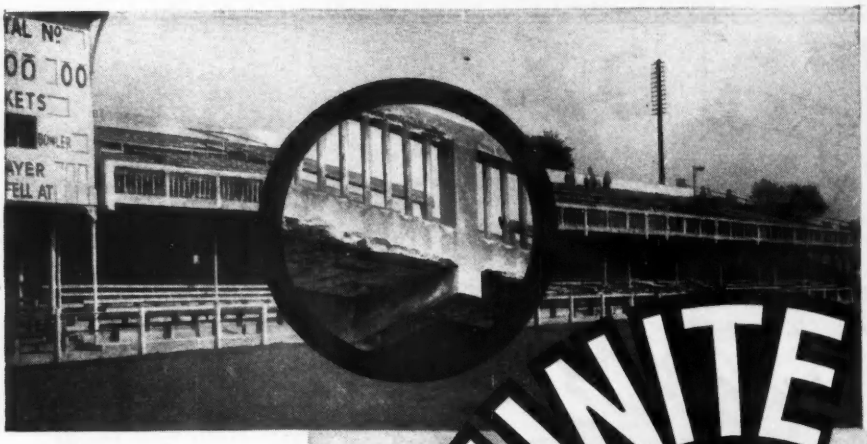

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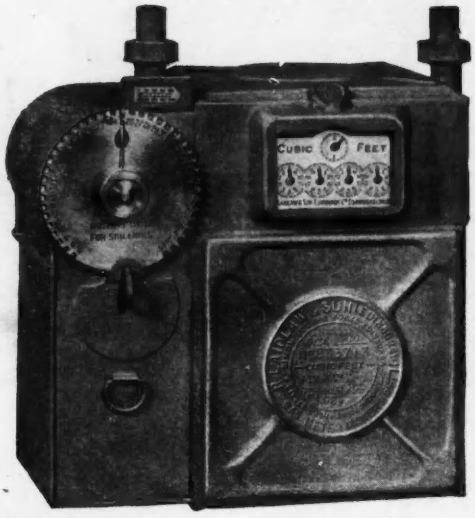

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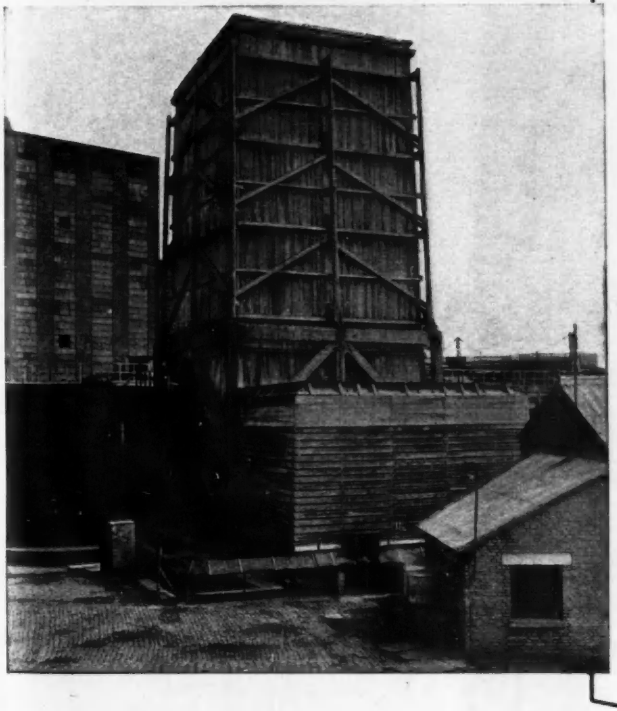

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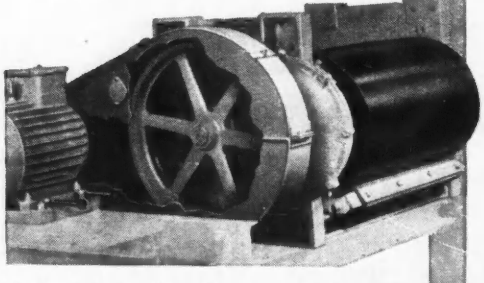

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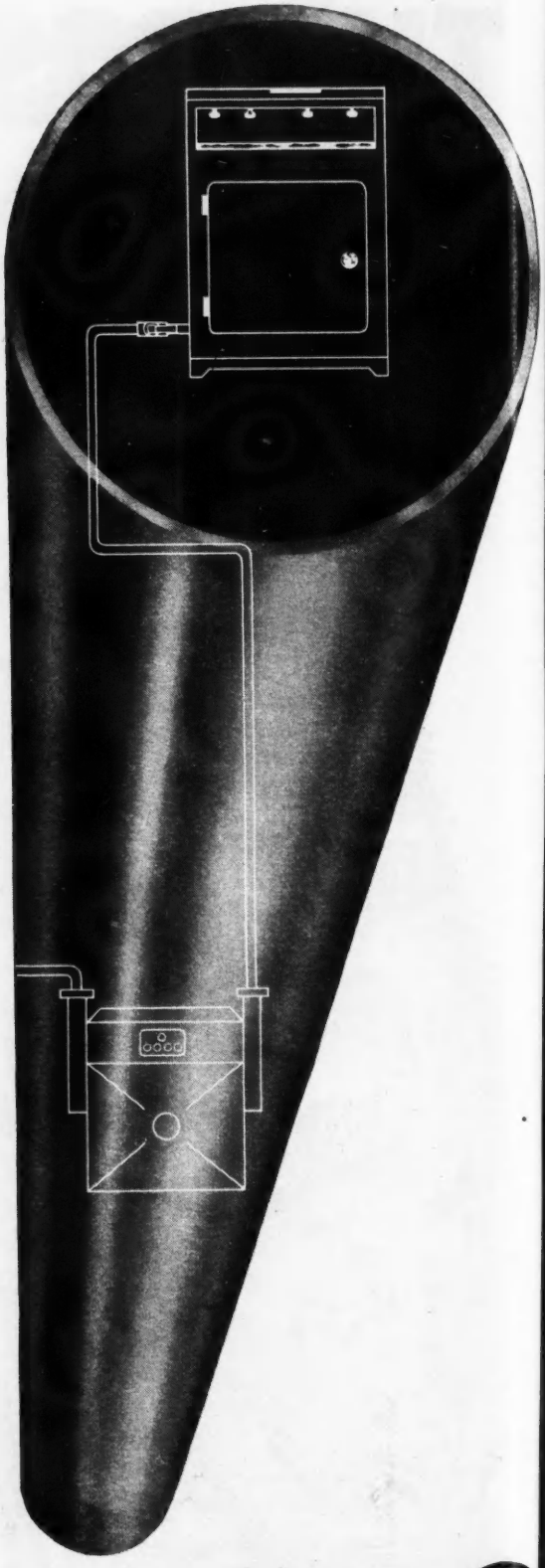

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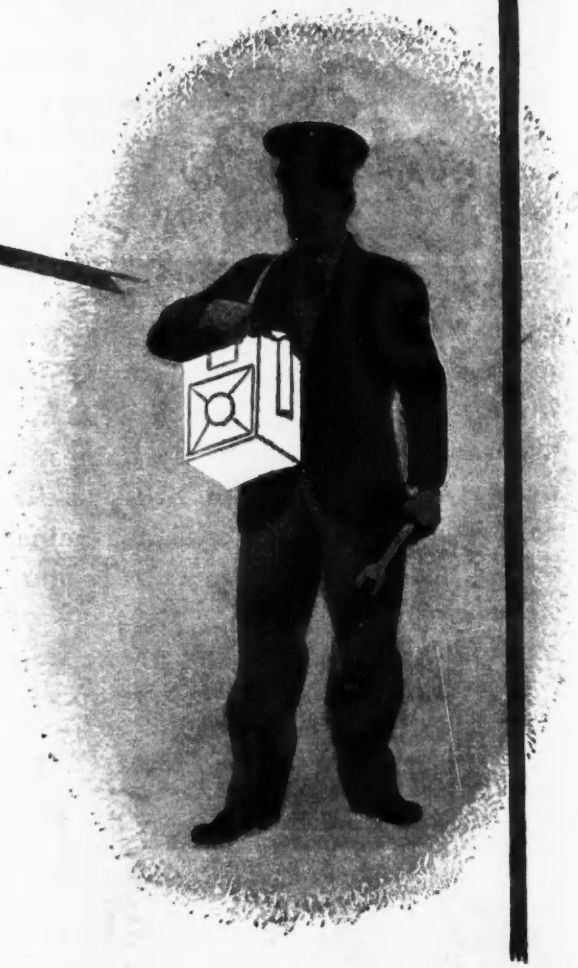

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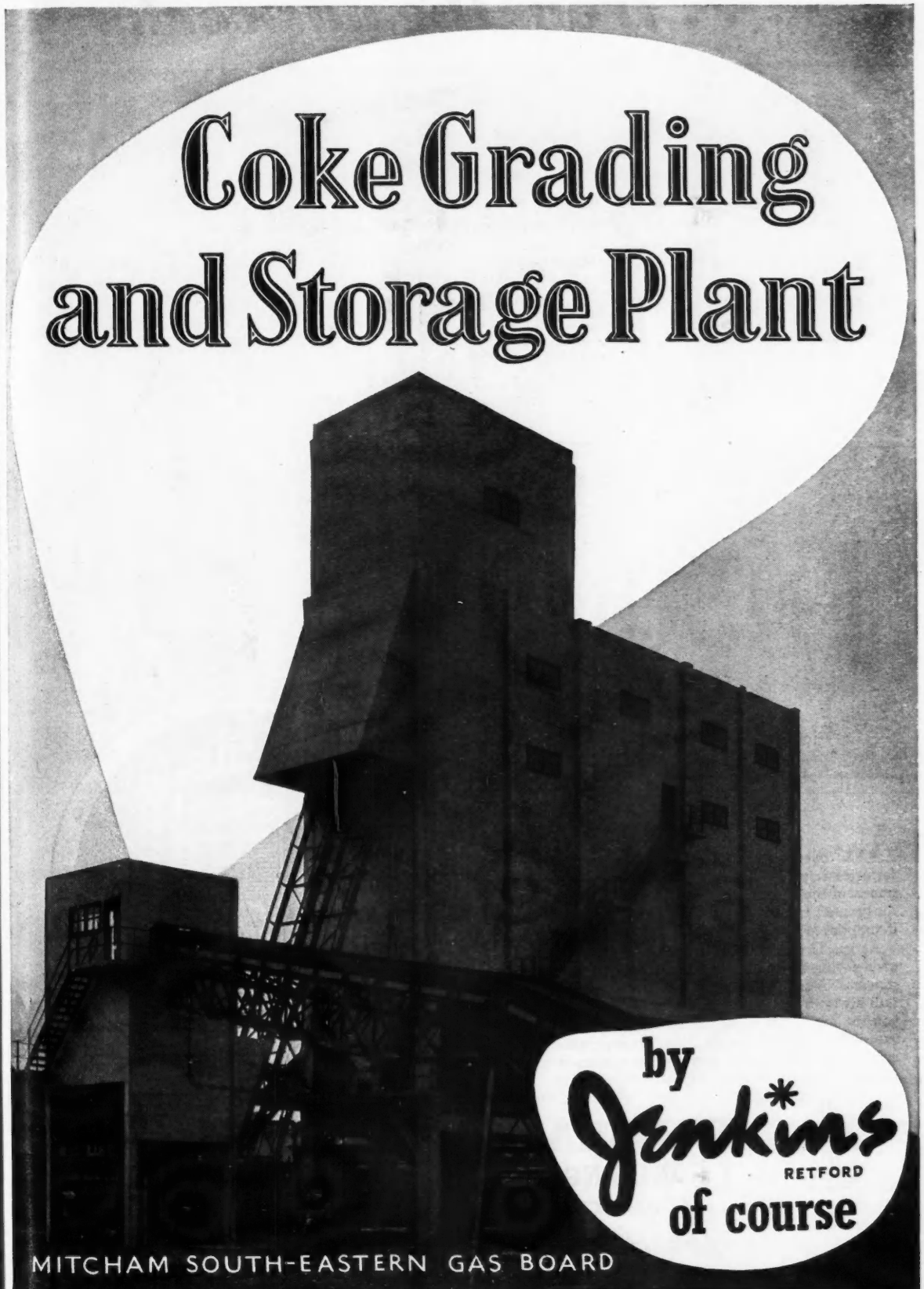

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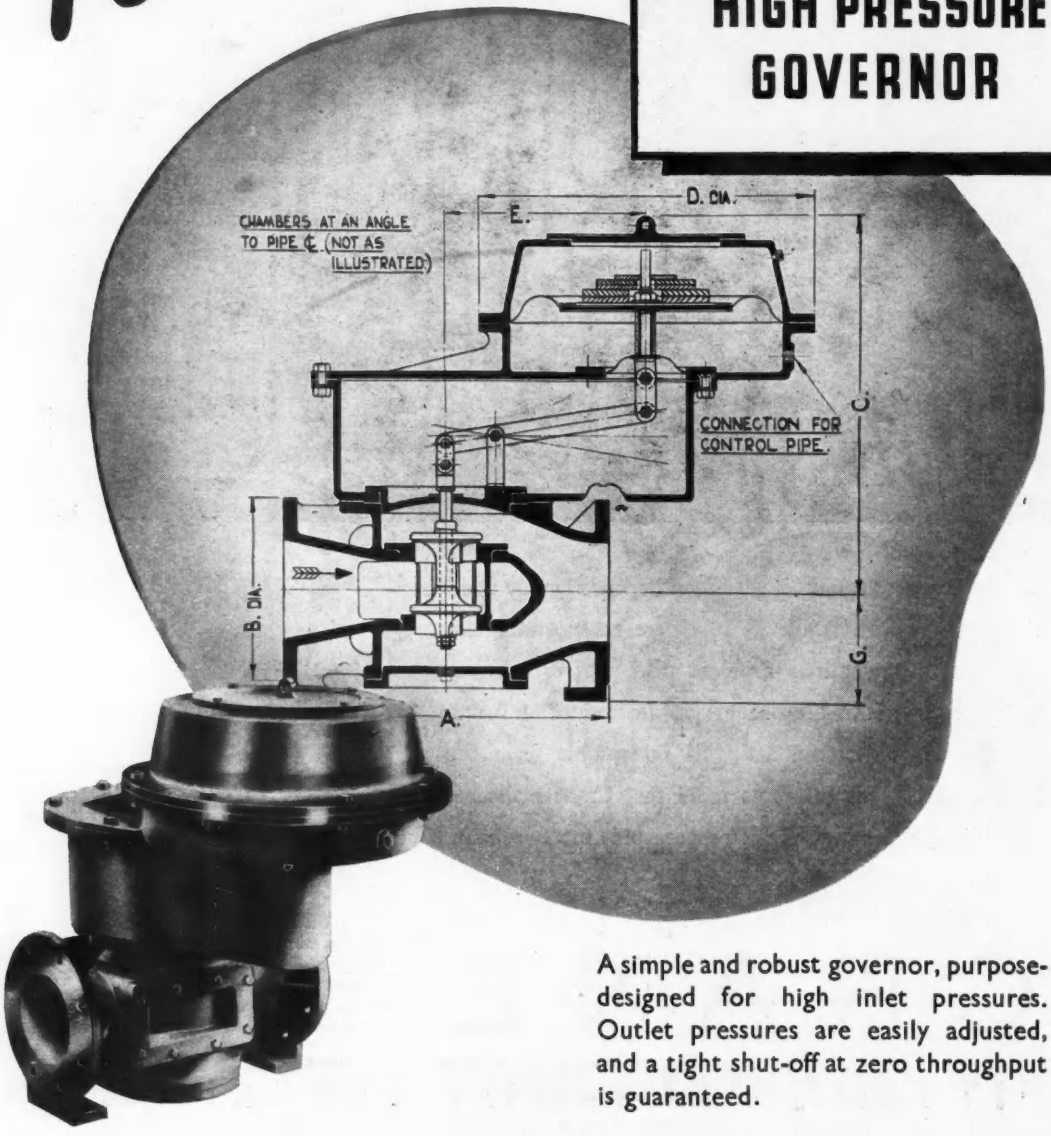

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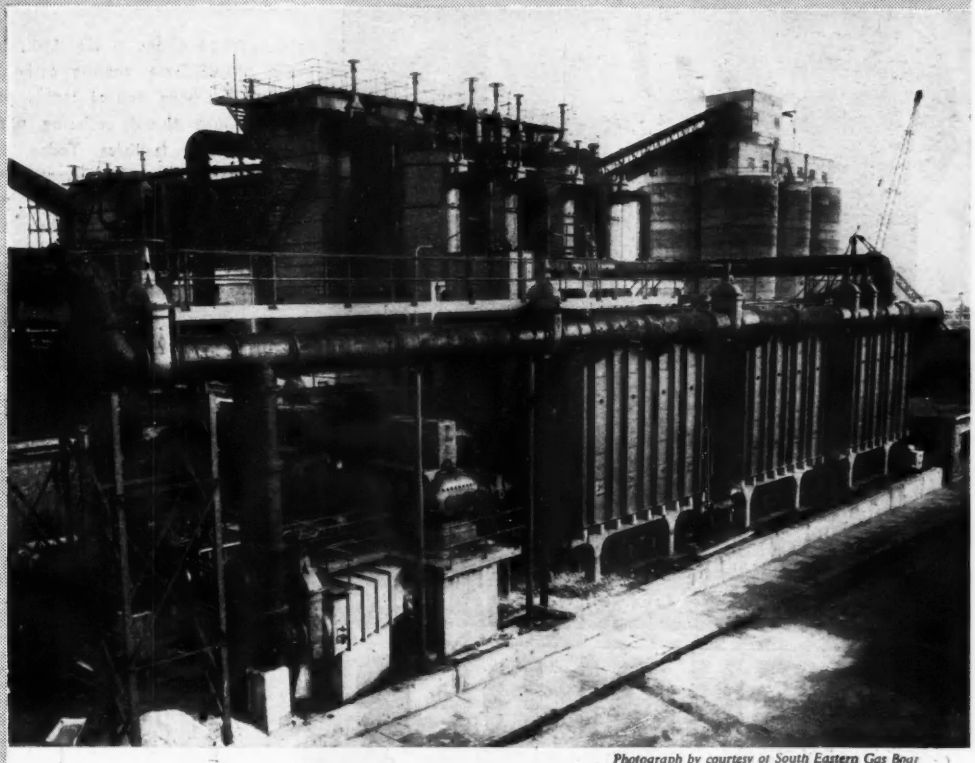

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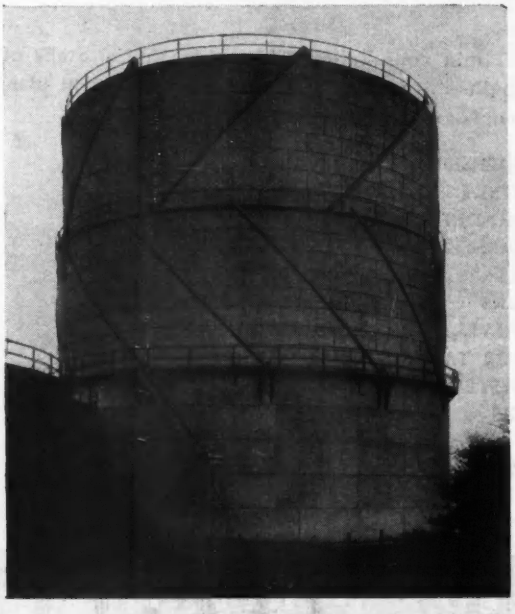

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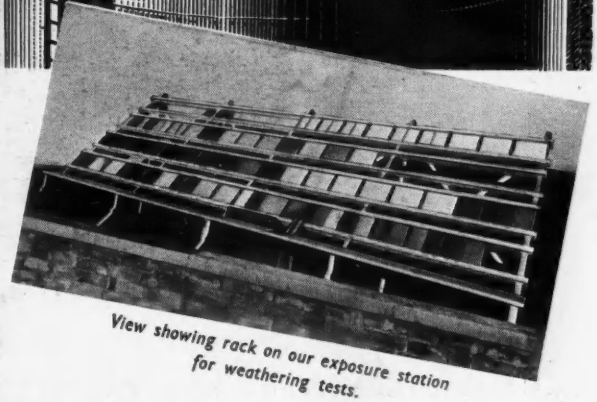

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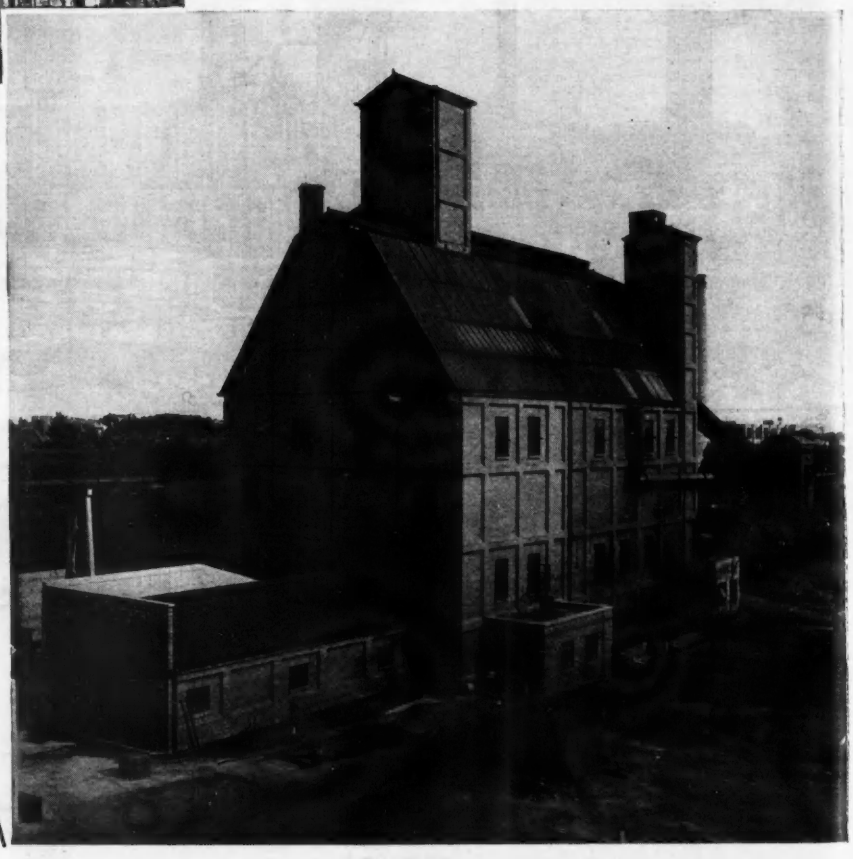

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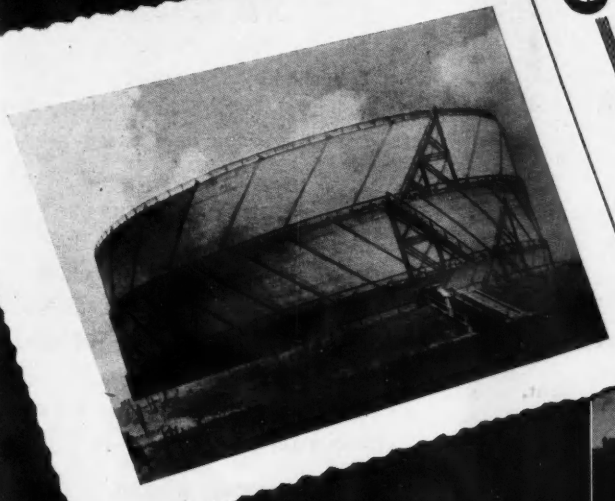

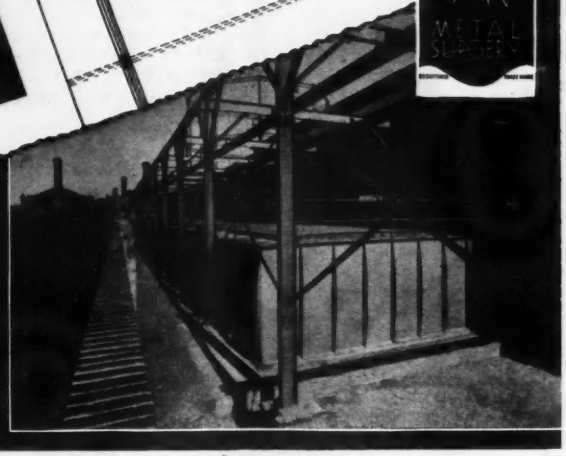

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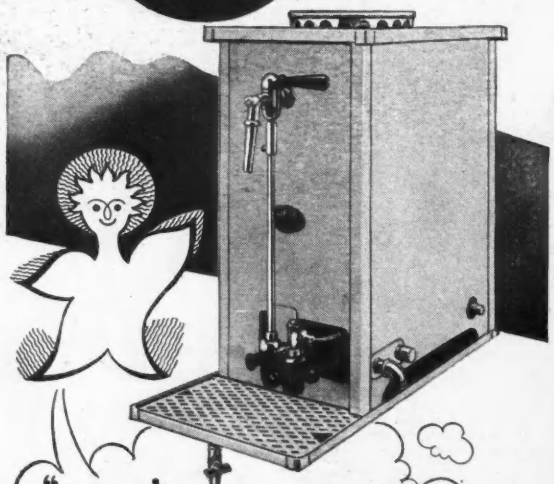

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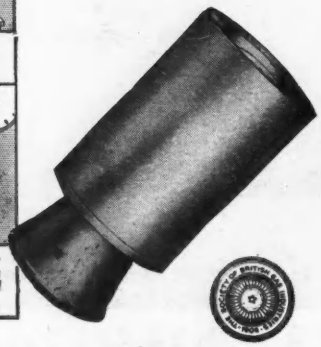

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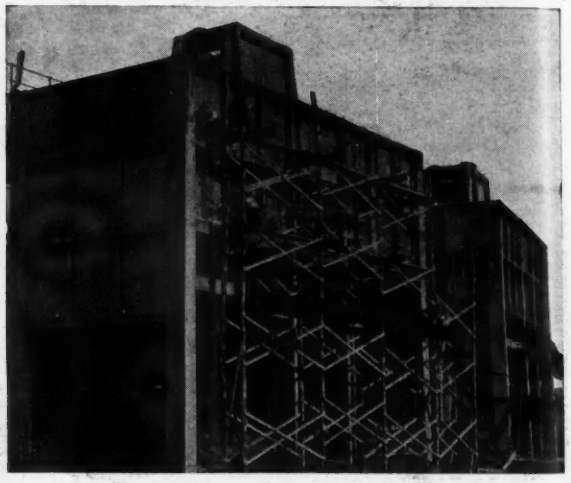

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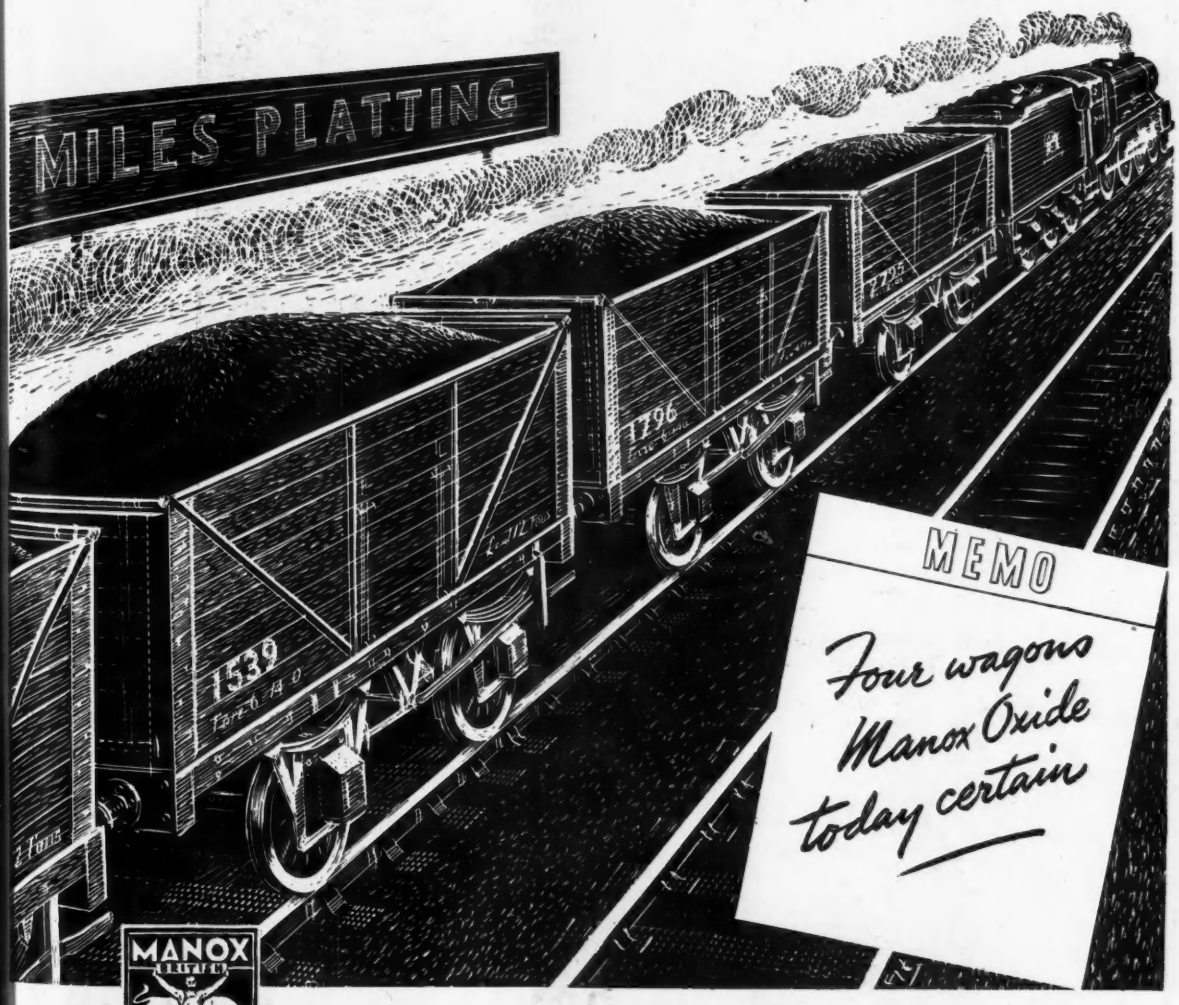

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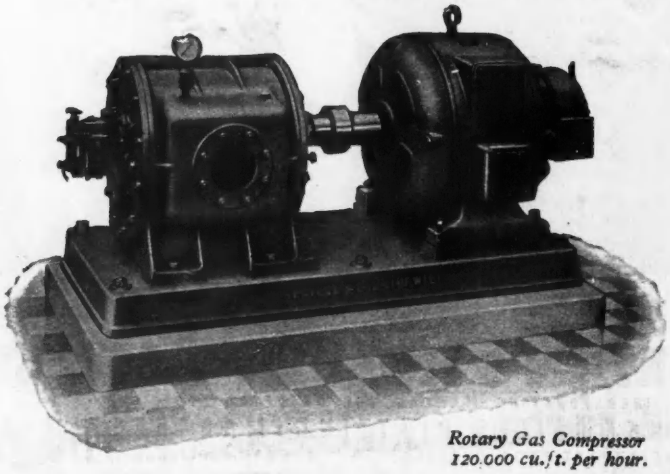

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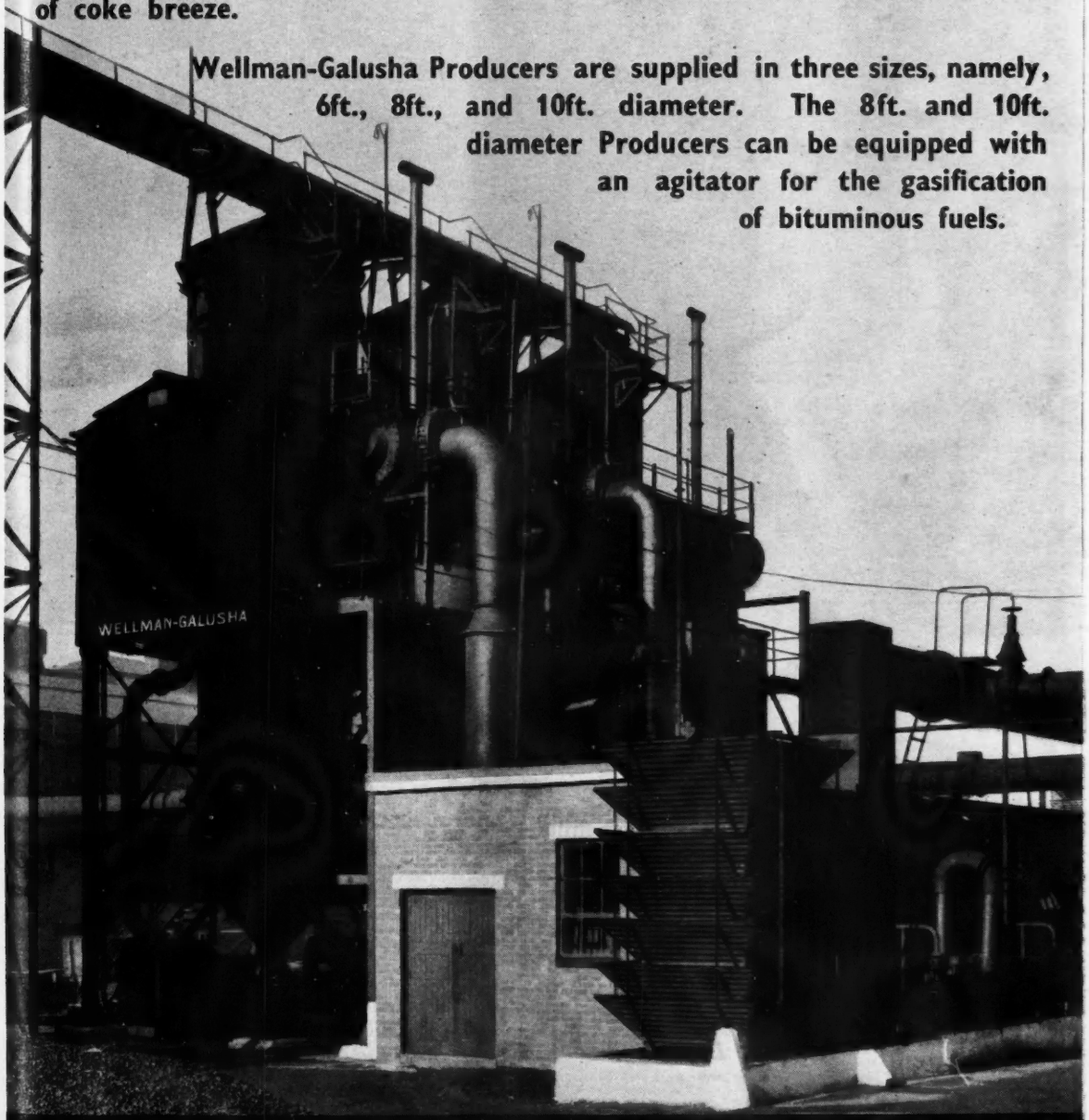

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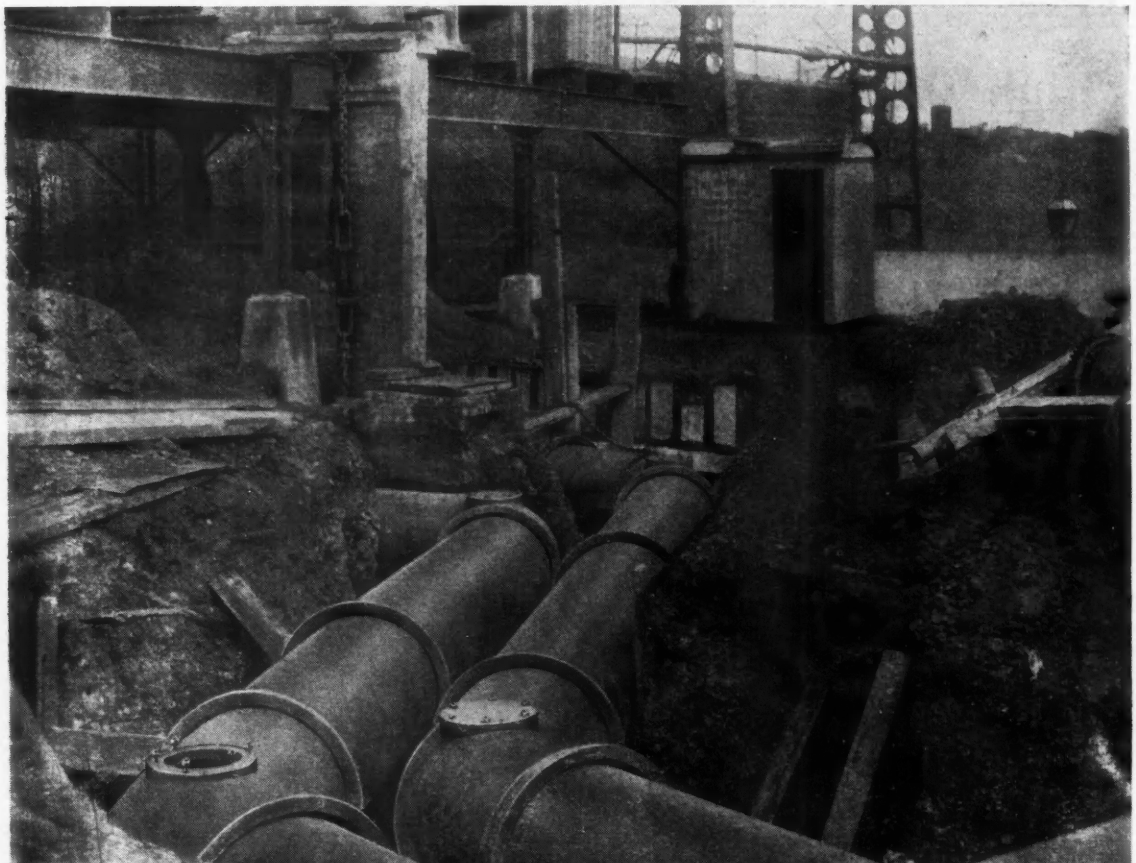

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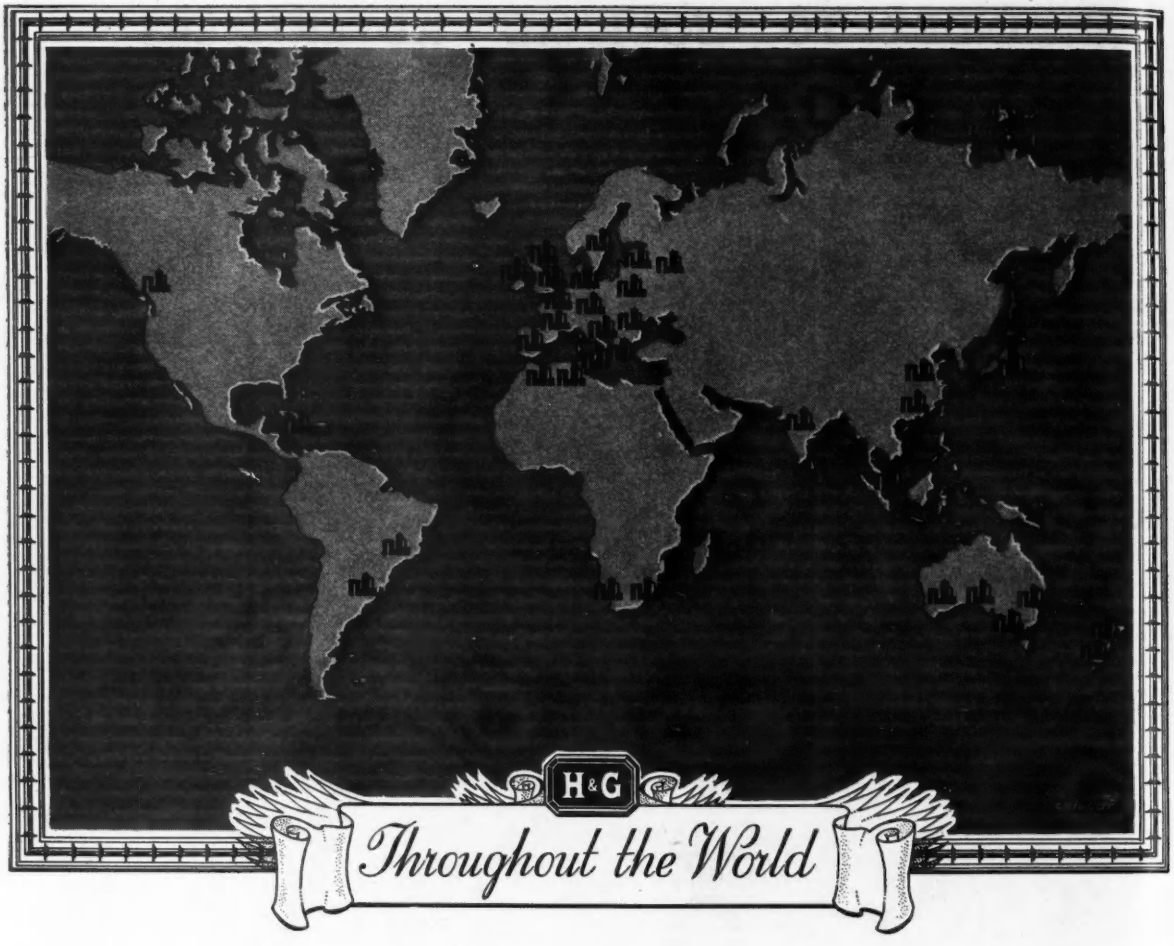

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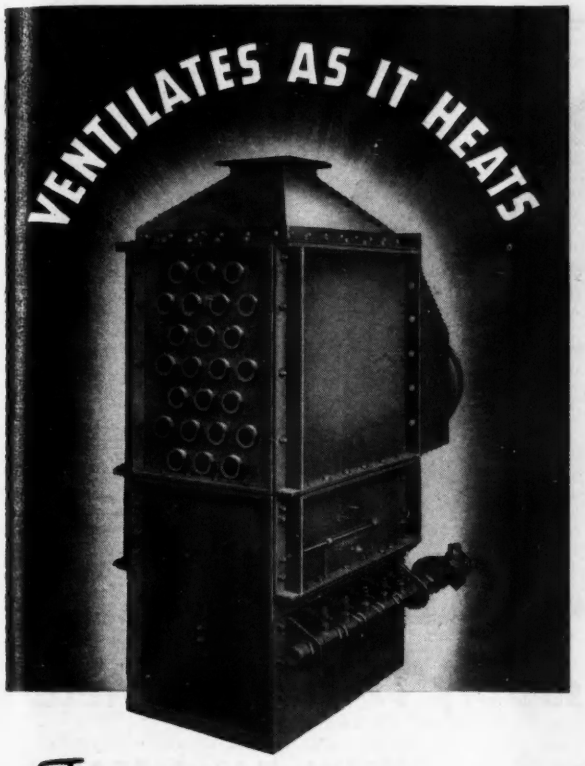

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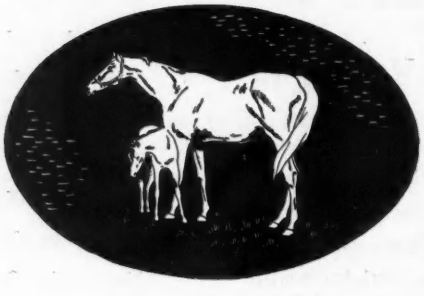

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GAS JOURNAL

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REFRACTORIES

EACH year when the Report of the Refractory Materials Joint Committee comes up for consideration at the research meeting of the Institution one wonders whether to marvel more at the pertinacity with which research workers pursue solutions to the extremely complex problems presented to them in this field or at the meagreness of the funds and resources placed at their disposal. This year again Mr. Rhead and, in a veritable tornado, Dr. A. T. Green, contrasted the amount of capital sunk in refractories by the gas industry, some £15 mill., the high cost of maintenance, about £1 mill. per annum, and the low figure £3,500 per annum allocated to the refractories branch of the British Ceramic Research Association. As far as we remember two out of the several thousands of continuous vertical retorts in operation have so far been equipped with the necessary appliances for life study. Dr. Burns promised one more; Mr. Birks interjected 'make it two,' but perhaps these were figures of speech. Mr. Crowther was sure that if the area boards were approached on this matter their response would be sympathetic. But if more retorts are selected for observation, more research workers must be detailed and paid to carry out the work. It is to be hoped that when the Gas Council has made up its mind what to do in the financing and organisation of research in general it will give these facts and these views the fullest and most sympathetic consideration.

About the complexity of the factors affecting the life of retort materials there can be no question. Heaton's work on a 'temperature survey' of one continuous vertical retort has been continued by Laming on another. This second survey cannot be said to have added much new to the first, but it did confirm the observations. In this report the word 'flaking' is used more often than 'spalling.' It is thought possible that flaking may be accentuated by fluctuation in retort wall temperatures. If that is so it would be worth a lot to reduce this fluctuation as much as ever possible, an ideal which is always before the eyes of designer and operator. As Dr. Rigby said, anything promoting the smooth working of the retort will militate against flaking. For instance it was observed that a regular cycle of temperature exchange coincided with fluctuations in the quantity and quality of the producer gas resulting from the operations of cleaning and charging the producer. These fluctuations are absent in the mechanical producers now coming into use. It is not surprising that hanging charges give rise to big temperature fluctuations in the retort face, but with due attention to detail in operation these should be avoidable. But scurfing operations are unavoidable. It is here that skilled attention can pay high dividends. It has been pointed out more than once that this important operation is too much and too often left to the non-technical manual worker in the retort house. We may assume, however, that scurfing operations on the retort under observation were conducted under the most expert supervision. These figures, then, represent the least fluctuations which can be expected. It is well worth while to see that they are never greatly exceeded.

The conclusions drawn from these two temperature surveys are perhaps as definite as can be expected from so limited a field of observation. In the future it is to be hoped that several more retorts, and of different types and designs, will be placed under lengthy observation. It might also be well if one or two more thermocouple positions were selected. A point, for instance, towards the end but not *at* the end of the major axis might show that heat transfer to the charge takes place from the side of the retort just as it does towards the middle of the minor axis. The attempt to relate temperature survey to varying throughput might be followed up and if extended over a number of retorts using different coals and steaming at different rates it might throw light on the distribution of scurf over the length of the retort.

The experiments directed to the attempt to reproduce

flaking or spalling phenomena in the laboratory are a very fine piece of work. We even seem to come near a working hypothesis—that 'growth' on the surface of the retort brick brought about by successive waves of carbon penetration under fluctuating temperature conditions may give rise to fractures parallel to the surface and at some depth beneath it. Is that the same as the proposition in the report that 'maximum flaking probably occurs where the combined effects of a high carbon gradient, surface growth and temperature variations are at a maximum?' 'Carbon gradient' appears to suggest that it is not so much total carbon impregnation as the ratio between carbon deposited on (or is it 'in') the surface and that in the pores deep within the brick. It is still pretty elusive. And, by the way, the observation that 'little or no difference in flaking tendency between silica and siliceous material can be observed in practice' suggests that there is too much difference in the descriptive words applied to the two materials really in question. Could we not say 95% and 90% silica respectively? We look forward to materials of more widely differing characteristics when the investigations of the French and South African materials in comparisons with English refractories are reported upon.

The remainder of the report is occupied by what is to be regarded as the continuation by Professor Roberts and his colleagues at Leeds of the study of the modifications of quartz. Further instalments are to come, with results which it is promised will throw light on the complex changes occurring in refractories during their service in carbonising plant. And right at the very end we read of the field investigations in progress on a setting of intermittent verticals. It will be interesting to hear more of this.

SERVICE DEPARTMENTS

GAS consumers in general know—or should know—much more about the operation of the gas industry now than they did before nationalisation, for scarcely a meeting of a consultative council passes without some information being communicated from the area board, through the council, to the general public. This has been particularly the case with those councils which have made a practice of inviting principal officers of their respective boards to address them on their own specialised jobs. The talk on the rôle of the service departments which Mr. W. S. Gooch, Controller of Services, North Thames Gas Board, gave to the North Thames Consultative Council a few days ago was a specially noteworthy example of the ready and willing imparting of information on some of the aspects of the Board's work which more directly affects the average consumer.

Mr. Gooch told the Council that in 1949 the Board's fleet of 910 vehicles covered a total mileage equal to 230 trips round the earth's circumference and delivered 273,000 tons of coke to domestic and industrial consumers. Over 800 awards have been presented to drivers for safe and accident-free driving, and last year 89% of the total qualified for the annual award. The estate department and the building and property maintenance department looks after 850 properties, ranging from the 500-acre gasworks at Beckton to employees' cottages, some of which are over 80 years old.

Some impressive figures were given about the work of the stove and meter departments. In 1949 more than 189,000 appliances were supplied to consumers and 69,000 were returned, including 46,000 old black cookers, many of which were completely renovated, fully enamelled, and re-issued at a low rent to prepayment consumers. Approval has been given to a classification of all appliances in three categories—obsolete, non-current, and current—and all appliances coming under the first heading are scrapped as they are returned to the stove works. Over 190,000 meters are repaired or scrapped every year, and 200,000 new or repaired meters are issued.

When the North Thames Gas Board took over it was fortunate in that the Gas Light and Coke Company, as large as some area boards, had already got its service departments functioning smoothly and successfully, and the obvious step was to extend them to cover the rest of the acquired area. Hard and fast rules were, however, avoided, and district managers were allowed to retain individual interest in the functioning of service matters within their districts, subject to compliance with the Board's policy and standards and observance of proper accounting procedure.

FLUIDISED OXIDE PURIFICATION

THE Institution Gas Research Fellow is to be warmly congratulated upon the lucidity with which he presented the results of his work on the further development and adaptation of the fluidised solids technique to the removal of hydrogen sulphide from crude town gas and the recovery of the sulphur from the oxide. The Council of the Institution is to be thanked for the manner in which this work was presented to the autumn research meeting, saving the main body of the members from the necessity of ploughing through voluminous details of scientific work while giving them all the results of that work which they need to know.

While Dr. Johnson's work appears to be a continuation of that described by Williamson and Garside last year the emphasis in this year's report is rather on the economic advantage of the recovery of sulphur from coal than upon the immense advantage which would be gained by the perfection of a continuous process of the kind suggested for the dry purification of coal gas. He shows that if the sulphur could be recovered in so pure a state as to rival that obtained from other sources it would go far to obviate the necessity for importing sulphur which is now purchased in dollar countries. It appears to be going too far to hope that the whole of this import could be avoided; the saving of 28% of it may be practicable. And the process suggested seems to meet the condition that the sulphur can be recovered in sufficient purity and within the available margin of cost.

Briefly the Research Fellow's achievements are, mainly, two. He has produced two formulæ (the mathematical treatment promised in last year's paper) by the use of one or other of which he can calculate the size of the vessel in which a given volume per hour of foul gas can be purified in a fluidised bed of oxide and he has added to this apparatus upon which full scale plant can be modelled

for the extraction of pure sulphur from the spent oxide. At this point, the non-scientific will require to form a mental picture of the fluidised bed of oxide. And here we return to last year's report. The authors were writing of the use of this technique in the catalytic cracking process. They said 'Briefly, the fluidisation or fluidised solid technique involves the passage of suitable oil vapours vertically upwards through a bed of finely divided catalyst material under such conditions that the latter becomes a dense, turbulent mass having the appearance and many of the properties of a boiling liquid.' Substitute foul gas for oil vapours and oxide for the finely divided material and you have the fluidised oxide purifier. The oxide is, as it were, 'air-borne' in the gas. The gas is the fluidising medium. The sulphur recovery process is a little different in that it involves the use of a liquid solvent (benzole is suggested) and this liquid is then the fluidising medium. The two formulæ given, one for the gas and one for the liquid, enable the appropriate velocity of the medium through the bed to be calculated, a velocity at which 'slugging' will not occur.

There appear to be no practical difficulties which cannot be overcome in the design and operation of a full working scale pilot plant on these lines. The preliminary removal of the tar from the foul gas by means of electrostatic precipitation should be easy. The prize for success is so striking and so obvious to all that there should be no hesitation in going forward. It promises an end to oxide hardening and its attendant labour troubles. It would substitute for the present uneven and uncertain reactions between the foul gases and the several parts of a more or less solid bed the definite contacts between gas and what is practically liquid. It presents a piece of apparatus far more amenable than the present purifier box to precise scientific control. And it would yield a sulphur saleable to the acid manufacturer at the top price. There are further possibilities in the fact that the oxide, after the sulphur has been recovered from it, is restored nearly to its pristine activity. If that were so one could contemplate using a medium of more definite composition than bog ore even if it were considerably more expensive in first cost. It is to be hoped that in this instance there will not be any avoidable lag between research results and practical realisation.

PICTORIAL PROFITS

OFFENCE will no longer be given to gas shareholders in this country when we suggest that the annual report and accounts of the Consumers' Gas Company of Toronto stand out as an example to all public companies. By comparison, the erstwhile counterparts in our own gas industry and, indeed, those of most other firms who publish annual statements pale into insignificance. We are not referring to the working results of the Toronto company (good as they are with a 5.3% increase in output), but to the method of presentation to the proprietors. The general run of company reports and accounts, while complying with statutory requirements, is largely unintelligible to the average shareholder. There are doubtless not a few shareholders who—unless it is obvious from the name—have but a hazy idea of what the company produces. We may invest some savings in what our broker recommends as 'a good thing' or we may inherit a few securities from a relative—and, apart from a brief reference to the dividend, the annual reports and accounts, unless we are qualified accountants, leave us cold. References to taxation equalisation accounts, deferred liabilities (which sounds like something we should like to do with ours), and unamortised debt discounts produce in us a mental daze. The directors of the Toronto gas undertaking, however, publish an illustrated brochure which clothes otherwise dry-as-dust facts and figures in a liveness and readability which makes it a pleasure to peruse. The purport of each financial transaction is clearly explained, while full-page photographs portray various aspects of the undertaking's activities. Among the latter is a striking view of the foundations of the largest gasholder in Canada and the largest of its type in the British Empire—an al-welded construction of 10 mill. cu.ft. capacity. We congratulate the company not only on its results but also on the excellent way it presents them.

Letter to the Editor

STEEL GRIDS FOR PURIFIERS

DEAR SIR,—Our attention has been called to a report in your issue dated November 29 under the above heading, and it might be of interest to your readers to learn that we have been experimenting with metal purifier grids for some four years, in which connection we have utilised various alloys and also steel, the application thereof being covered by patents.

It is, however, a little too early to indicate the result of our research in this matter.

Yours faithfully,
W. C. HOLMES AND CO., LTD.
GEORGE WILSON GAS METERS, LTD.

475, Foleshill Road,
Coventry.
December 12, 1950.

Gas Service Pocket Book, 1951

An Announcement

Sales of the 1951 'Gas Service Pocket Book' have constituted a post-war record. The edition is now SOLD OUT. To avoid disappointing late-comers we plan to reprint the issue, but our decision depends on the speedy placing of orders. No doubt there are many who still need this book. Will they please let us know their requirements as soon as possible and certainly not later than December 29. The decision regarding reprinting will be made on the orders then in hand.

Price 3s. 6d., post free.

WALTER KING, LTD., 11, BOLT COURT, FLEET STREET, LONDON, E.C.4.

Personal

Mr. **A. B. Briggs,** Assistant Engineer and Manager at Helensburgh, has been appointed District Manager at Buckie.

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Mr. **J. O. Twinberrow** is retiring at the end of this month from the position of Manager of the Publicity Department of Babcock and Wicox, Ltd., to take up an appointment as Secretary of the Boiler Availability Committee. Mr. **G. M. Peacock,** A.M.I.E., has been appointed to succeed him.

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Sir **Archibald Forbes** has been appointed Deputy-President of the Federation of British Industries. He is an executive Director of Spillers, Ltd., flour millers, and Chairman of the Debenture Corporation. He was Chairman of the Iron and Steel Board—consisting of representatives of both sides of the industry and independent members—from its inception in 1946 to its termination in March, 1949. When, a few months ago, the F.B.I. Defence Programme Committee was formed, Sir Archibald was elected Chairman, a position he will continue to hold.

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Lord **McGowan** is retiring from the Chairmanship and membership of the board of Imperial Chemical Industries, Ltd., at the end of December. At 76 he has been associated with I.C.I. and its predecessors for more than 60 years. He was Chairman of Nobel Industries, Ltd., when that Company merged with Brunner Mond, United Alkali, and British Dyestuffs, to form I.C.I. in 1926, and was the first President and Deputy Chairman of the combine, succeeding as Chairman the first Lord Melchett, who died in 1930. He has accepted the position of Hon. President of the Company from January 1. Lord McGowan's successor as Chairman is Mr. **John Rogers,** a Deputy Chairman since 1940, who has been associated with the Company and its predecessors since 1899.

Obituary

The death took place on December 7, at the age of 57, of Mr. **James Walker,** Secretary of General Refractories, Ltd. Mr. Walker joined the group in 1936 as Secretary of the Glenboig Union Fireclay Co., Ltd., and became Secretary of General Refractories, Ltd., in 1943.

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The death occurred on December 11 of Mr. **John B. Ferns,** Engineer and Manager, Hamilton District, Scottish Gas Board, at the age of 62. Mr. Ferns, after serving an engineering apprenticeship with John G. Kincaid, Marine Engineers, Greenock, entered the gas industry in 1910, taking up duties with the Glasgow Corporation Gas Department. In 1913, he entered into employment with the Johnstone Corporation Gas Department till 1917, when he joined the Stockton-on-Tees Borough Gas Department. In 1918, he was appointed Works Manager to the Aldershot Gas Company, where he remained till 1926, when he was appointed Assistant Engineer and Manager to the Hamilton Corporation Gas Department. On the retirement of Mr. David Robb in 1933, Mr. Ferns succeeded to the position of Engineer and Manager.

In the report of the Department of Scientific and Industrial Research for 1948-49 it is mentioned that the transfer of the Survey Laboratories to the National Coal Board caused some minor difficulties in maintaining adequate contact between the Fuel Research Station and certain industrial developments in the provinces. This was because the Survey Laboratories served many purposes besides the normal examination of coal seams and marketed products. These difficulties were greatest in Scotland in connection with the research work on domestic heating. About half the output of domestic heating appliances in Great Britain for burning solid fuel is produced in Scotland, and in view of the importance of being able to maintain close contact with the manufacturers and to be able to provide more easily available testing facilities a branch of the Fuel Research Station has been opened at Thorntonhall, near East Kilbride.

Diary

Dec. 28.—North Thames Gas Consultative Council: Westminster City Hall, Charing Cross Road, 2.30 p.m.

Jan. 2.—South Eastern Gas Consultative Council: Meeting, Croydon, 2.30 p.m.

Jan. 9.—Midland Junior Gas Association: 'Distribution of Gas in a Mining Area,' F. C. Hawkyard (Cannock). Birmingham.

Jan. 10.—Scottish Junior Gas Association (Eastern District): Visit to Durie Foundry, Leven.

Jan. 12.—London and Southern Junior Gas Association: 'The Performance of Continuous Vertical Retorts,' C. H. Lewis, 178, Edgware Road, W.2, 6.30 p.m.

Jan. 12.—Scottish Junior Gas Association (Western District): Paper by C. Campbell (Dawsholm). Royal Technical College, Glasgow.

Jan. 13.—Western Junior Gas Association: Visit to Bideford Works and short papers by Student Members.

Jan. 15.—Eastern Gas Consultative Council: Connaught Rooms, 2 p.m.

Jan. 17.—Eastern Gas Board (Cambridge Division) Salesmen's Circle: 'The Divisional Installation Manual,' S. Halls (Distribution Superintendent, Cambridge).

Jan. 19.—Eastern Junior Gas Association: 'About the Works,' L. W. Jarrett (Nottingham). Peterborough.

Jan. 20.—Yorkshire Junior Gas Association: 'Concerning Carbonisation,' R. K. Atkinson (Assistant Works Manager, New Wortley Works, Leeds). Wakefield.

Jan. 24.—Industrial Gas Development Committee: Gas Industry House, 9.30 a.m.

Jan. 24.—London and Southern Junior Gas Association: Visit to the works of Electroflo Meters Co., Ltd., Park Royal.

Jan. 29.—West Midlands Gas Consultative Council: Dudley Room, Queen's Hotel, Birmingham, 2.30 p.m.

Jan. 30.—London and Southern Section, Institution of Gas Engineers: 'Water Pollution,' P. Wedgwood, M.SC. (Production Engineer, Watford Division). Institution of Gas Engineers, 17, Grosvenor Crescent, 2.30 p.m.

NEW BRITISH STANDARDS

For some time a need has been felt for guidance in the dimensions to be adopted for hydraulic seals, and this has now been covered by the issue of a British Standard which lays down the basic dimensions for the standardisation of housings intended to accommodate hydraulic seals for use with reciprocating shafts where the friction caused by the seal is not of major importance and the working pressures do not exceed 5,000 lb./sq. in. It does not apply to seals for use on aircraft.

The standard deals with both long and short housings of the gland box and piston head types in the range of sizes from 3/18 in. to 20 in. inner diameter and ¼ to 21 in. outer diameter and it stresses the desirability of consultation between the designer of the housing and the manufacturer of the seal in order that the correct tolerances may be applied to ensure satisfactory operation of the seal. The standard will perform a useful function in enabling designers to choose the best basic dimensions to meet their needs and for which the proper seal will be available. Copies of this standard (B.S. 1658 : 1950) may be obtained from 24, Victoria Street, S.W.1, price 2s. post free.

Mr. D. P. Welman, Chairman of the North Western Gas Board, announced on Friday that essential industries and services in the area are to be assured of their full coke requirements this winter. Domestic consumers are likely to get only 80% of their last winter's deliveries. Recent sales have averaged 50,000 tons weekly against an output of only 30,000 tons.

IN PARLIAMENT

'Hopelessly Inadequate Target'

IN the debate on the work of the National Coal Board in the House of Commons on December 12, Mr. R. S. Hudson maintained that over the last two, if not three, years the target of the coal industry had been hopelessly inadequate. It was, he said, not only ironic but tragic that we should be falling down on our promises and expectations to export a raw material vital to the defence and rearmament of Europe and the West.

The Opposition was calling for an enquiry into the working of the N.C.B., an enquiry which, argued the Minister of Fuel and Power, Mr. Noel-Baker, was untimely. In the middle of October, he said, the rate of increase in output per man-shift began to flag. In October and November of last year in the autumn drive the miners got 9 cwt. more than in the preceding weeks. This year it was 6 cwt. That difference of 3 cwt., if it had been simply the relative failure of the autumn drive, would have been serious enough, but if after Christmas the curve had not returned to normal and had gone through the winter at the same rate, then by April the loss would have been 2 mill. tons, or perhaps more, and supplies for industry and the domestic market would have been gravely short.

Commercial negotiations for the purchase of coal oversea were still going on and it was not in the national interest to give all the information requested on quantities, prices, freight rates, and the rest. The reduction in the amount for bunkers would give 200,000 tons more for home consumption, and the N.C.B. had been authorised to purchase up to 1,200,000 tons in the United States. The Government had also been offered coal from other quarters, and if it was of the desired qualities discussion would be held with those countries. The quantity it was proposed to purchase for all purposes and from all sources would be less than 2 mill. tons.

Loose Talk

'There is,' continued the Minister, 'a lot of loose talk in the House and very widely in the Press about miners' absenteeism before the war and now. Before the war the recorded average rate was 6.5 or thereabouts; this year the average is 11.96. The sickness rate of 7% is not higher than in other industry, and it is backed, in 90% of the cases, by a medical certificate. What is the answer? It is that before the war miners were forced by poverty to go back to work before they were fit.'

The only problem before the House was the 5% of voluntary absenteeism, or rather less than that. Would anybody say that a man down a mine was doing wrong if he had one day a month off? The miners got one week's holiday with pay, but many took a second week at their own expense, which accounted for quite a lot of the absenteeism. There was something to be done about absenteeism, however, and he hoped the miners would do it. In some areas, it was much above the average, and miners and management must try to get it down.

There was only one way of getting more coal, and that was by having now and for the next few years more miners. It was far harder to get them, and far harder to keep them, in conditions of full employment.

On one point the Ministry's estimates had been seriously wrong. The fall in man-power at the face in proportion to the whole had been greater than they expected. The fall was only 3%, but the effect on output was serious. This year the loss in manpower had been 22,000 men. The Government had agreed with the Coal Board that a vigorous effort should be made in this vital matter.

The Ministry of Labour and the Coal Board were beginning a vigorous campaign to recruit Irish workers for the mines. The problem of Italian miners was less straightforward. The Coal Board had been discussing with the National Union of Mineworkers proposals to bring some Italians over here. The union opposed the introduction of 'green' Italian labour, but there were available considerable numbers of trained Italian miners who had been employed in Belgian mines and were at present unemployed. If they were brought to this country they would not be sent to places where there were plenty of workers, but to where there was a shortage and men could not be upgraded to the faces.

Efficiency in Use

Mr. Noel-Baker urged the most rigid economy in the use of coal on industrial and private consumers. He believed that industry could save 2% of electric power without any loss of output, and this would save 100,000 tons of coal up to next April. If people at home and in offices could save 5% of electricity this would save 500,000 tons. If housewives could use 5% less gas they would save 400,000 tons of coal.

National efficiency in the use of coal was more important than economy, and everyone engaged in industry and commerce should study the efficient use of the coal they consumed.

Melbourne's Gas Supply.—Because the demand for gas outstripped the supply at Melbourne, Derbyshire, the East Midlands Gas Board has laid six miles of main in 22 weeks to link the town with the Notts. and Derbys. gas grid system and bring an ample supply of gas in time for the coming winter.

Exhibitions Were Recently Staged by the Fife Group of the Scottish Gas Board in several towns in the county to interest hotel proprietors and restaurateurs in large-scale gas catering equipment. The exhibition opened in Kirkcaldy's gas showrooms, where the latest gas catering appliances were displayed to numerous visitors. Prominent in this display was a 'Whitemount' pastry oven with three separate ovens, 30 in. wide and 30 in. deep, each controlled by individual thermostats. Also on show were the Chester double oven range, vegetable and pudding steamers, a vegetable boiler, and various domestic appliances.

NATIONAL GOOD HOUSEKEEPING WEEK

The Royal Society for the Prevention of Accidents is furthering the object of the Festival of Britain by organising a national Good Housekeeping week for British Industry from April 2 to 7, 1951.

The object of the week is twofold:

(a) To enlist the support of all employers and employees in securing tidiness and cleanliness in the workshop, for experience shows that they are invaluable factors in reducing accidents. Results thus achieved also increase productivity, eliminate waste and help in salvaging scrap material.

(b) To provide an opportunity for a general spring-cleaning of British factories in readiness for the Festival.

The running of the week is the Society's response to a request from the Festival of Britain for its co-operation in ensuring the success of the Festival. A programme of suggested activities is being drawn up, and the Society is preparing special publicity material, including a booklet for distribution to factory workers. The Society's Industrial Accident Prevention Groups are helping in the local work of organisation.

In its letter to the local authorities, the Society has pointed out that the week can, with further advantage, be linked to the value of Good Housekeeping in the home and in everyday life.

Mr. G. P. Barnett, H.M. Chief Inspector of Factories, in a personal message to the Society, said: 'The whole-hearted implementation in our factories and workplaces of all that is comprised in the term 'good housekeeping' would most certainly result in a reduction in the large number of accidents which occur annually in industry owing to a lack of tidiness and a failure to conform to the maxim that there should be a place for everything and everything in its place.'

The Rôle of the Service Departments

SOME impressive figures were quoted by Mr. W. S. Gooch, Controller of Services, North Thames Gas Board, when he gave an address on the rôle of the service departments to the North Thames Gas Consultative Council on November 30. He explained that the term 'service department' referred to a group of five departments—transport, estate, building and property maintenance, stoves, and meters—whose function was to provide the various services to the other departments of the Board.

By W. S. GOOCH,

Controller of Services,

North Thames Gas Board

In most small undertakings it would generally not be an economical proposition to set up specialised departments to provide these services, but within the Gas Light and Coke Company, which alone was as large as some area boards, specialised service departments had been functioning for many years and had established themselves as a necessity.

On nationalisation it was, therefore, reasonable to extend these services to all districts but the service organisation of the districts other than Gas Light were not so completely assimilated by the service departments of the Gas Light and Coke Company that the local officer completely lost all initiative for such matters. District managers still retained individual interests in the functioning of service matters within their districts, and could propose modifications or improvements provided, of course, that such proposals and requirements conformed to the Board's policy and standards as a whole and that the proper accounting procedure was observed.

Hard and fast rules were avoided where possible, the general operation being designed to give the greatest degree of assistance to department heads.

In all matters where it was necessary to maintain a common standard throughout the Board, or to implement the Board's policy, or where specialised knowledge or opinion was necessary the matter was handled centrally by the service departments.

Transport

The transport department was probably the only service department of the Board they had personally seen in operation in their daily movements through London.

The Board's fleet consisted of 910 vehicles in addition to which there was a stud of 50 horses. This fleet handled goods and met traffic demands of great diversity of character. In all, the size of the fleet and wide range of goods and traffic that it carried placed it among the largest mixed traffic fleets in the country.

Nationalisation did not present many problems where transport was concerned. A large fleet with the basic organisation was already well established in the Gas Light District. Other districts brought an additional 178 vehicles, representing 23% increase on the Gas Light fleet. The first steps taken were the integration of all vehicles into one fleet under the transport manager, the re-naming and re-numbering of all vehicles, centralisation of licensing and petrol supplies and the institution of standard costing, vehicle maintenance and repair. Where re-painting was necessary the Board's standard colours were used. The total number of vehicles in the combined fleet immediately after nationalisation was 966.

While integration of the fleet was in progress all vehicles previously operated by districts other than Gas Light, and the older vehicles of the Gas Light fleet, were examined by the transport department's technical staff, following which 81 vehicles were scrapped. The result of the scrapping programme and the re-allocation of new vehicles resulted in an overall reduction of 56 vehicles. The general reliability and standards of the smaller fleet had in consequence improved.

The headquarters of the transport organisation is at Malcolm House, Fulham, where the transport manager and his deputy are situated with the clerical and accounting organisation. The main repair organisation is at Brentford, where the maintenance and repair of engines, chassis and bodies are undertaken. For operational purposes, the Board's area is divided into five territorial divisions—the headquarters of each transport division is at one of the Board's main garages where there is a divisional transport officer, who has under his direct control an allocated number of the Board's vehicles. The divisional transport officer is reponsible for the servicing, availability, and efficient use of all the vehicles allocated to him. It is his job to give service to all vehicle users in his area and to keep the necessary records so that the users can be charged for the vehicles supplied. The five divisional transport officers maintain close contact with each other and with the transport headquarters so that cross area vehicles run to maximum capacity with combined loads and so that extra traffic demands can be met by the drafting of extra vehicles to the place where needed.

Over the last year the Board's fleet covered nearly 6 mill. miles, equal to 230 times round the circumference of the earth. It delivered 252,000 tons of coke in sacks to customers in addition to the bulk delivery of 23,000 tons of coke to commercial and industrial consumers. Some 2 mill. gal. of tar were sprayed on roads by the Board's fleet of tar spraying tankers, which constitute the most complete and technically advanced tar spraying fleet in the country. It provided vehicles for main-laying and gas distribution work, compressors for road excavating, covered vans for the delivery and collection of gas appliances at consumers' premises, vehicles of every type for general service duties including the bulk transportation of inflammable liquids such as benzole and toluole. It provided mobile showrooms, decorated carnival vans, mobile offices, radio vans, coin collection vans and bulldozers and maintained an inter-office delivery service of light vans running to a daily time schedule. An emergency night service is operated with vans equipped with radio-telephone capable of dealing with any emergency that might arise on the district. The Board's transport has never failed to meet any emergency that has arisen.

To encourage safe driving all drivers are entered for the safe driving competition organised by the Royal Society for the Prevention of Accidents and the Board grants a cash award to all drivers who complete a year's driving free from accidents. In 1949 89% of the Board's drivers qualified for the annual award. Many major awards have also been granted by the Royal Society to the Board's drivers, the outstanding being two awards for 30 consecutive years of safe driving; five for 25 consecutive years; 32 for 20 consecutive years; and 107 for 15 consecutive years, while for 10 and five years safe driving the Board's drivers have won no less than 700 gold and silver medals.

Estate Control

The other two service departments whose activities are relatively unknown to the public are those concerned with the Board's land and property, these being the estate department and the building and property maintenance department.

Like most organisations of similar size the Board is a large land and property owner, which of course is understandable when one remembers that, over the period of 140 years of enterprise and expansion the acquisition of land and buildings has been one of the essentials of development.

Some of the Board's property is deeply rooted in the foundations of the gas industry in this country. The first permanent gasworks ever to be erected for public supply was on a piece of ground at Horseferry Road acquired in 1813 to form the Peter Street works. The Board owns some 850 properties ranging from the largest gasworks in the world at Beckton (which covers approximately 500 acres), to cottages, many of which were erected over 80 years ago

to provide accommodation for the key men on gasworks then situated in almost rural surroundings.

Estate control falls naturally into two functions: (a) estate management under the Board's surveyor, and (b) building and property maintenance under the building and property maintenance superintendent.

The estate department deals with the more professional aspect of the control of the Board's land and property including all negotiations on the Board's behalf for the purchase and sale of land and property, granting leases, the preparation of valuations required by the Board and the numerous day-to-day matters which arise in normal estate management such as problems under Town and Country Planning, Public Health and other legislation.

Building Maintenance

As the name implies, the building and property maintenance department is responsible for maintenance of all premises, including new buildings, except gas-making stations, for which the chief engineer is responsible, and the products works, which come under the controller of by-products. The work of the department can be divided into two main categories: (a) maintenance and repair of all buildings including mechanical and electrical equipment, furniture, office machines and equipment within each building; and, (b) planning and development of new buildings, alterations and enlargements of existing buildings, together with the work of re-allocating and furnishing accommodation to meet the varying needs of the departments.

Maintenance and repair work to the Board's property in the central areas is mainly undertaken by the direct employment of a maintenance staff, but in the outer areas it is found more economical to use contractors. The work of both the Board's maintenance staff and the contractors is under supervision and inspection by the technical staff of the department.

The work of planning and development of new buildings, and the structural alterations to existing buildings is handled by a staff of qualified building surveyors. The whole of the technical, clerical, and accounting staffs of the department are accommodated together at Mill House, Fulham, so that close control is maintained of all work passing through the department. An overall maintenance programme is submitted periodically for authorisation by the Board.

The stove department is perhaps not very well titled for it deals not only with stoves but with every variety of gas appliance offered by the Board to the public. It handles the buying and stocking of all appliances and the repair, renovation, and scrapping of all obsolete appliances returned to the Board by consumers.

The activity of the department is revealed in the issue and return figures for 1949 which were 189,000 gas appliances issued to districts from stock, and 69,000 appliances returned from the districts, of which 46,000 were black cookers.

The work of the stove department is centred in the main workshops and warehouse situated at Harwood Terrace, Fulham, which is the headquarters of the department, and at Haggerston, Shoreditch. There is also a small workshop at Southend.

Bulk orders are placed on manufacturers according to pre-determined estimates of the Board's current and future needs prepared by the commercial manager. The deliveries of new appliances from manufacturers are routed to the various warehouses throughout the Board's area from which individual appliances are delivered to consumers' premises. The stove department is also required to control the stocks of appliances in the Board's warehouses.

All stocks of appliances are rigorously accounted for and there is a modern Powers-Samas punched card installation at Harwood Terrace to handle the appliance movement, accounting, and statistical side of the department's work.

The renovation of gas appliances, however, presents a great problem owing to the variety of appliances used; about 1,500 appliances of all ages and in every state of condition flow back to the stove shops every week. All appliances on the Board's area of supply have been reviewed and the Board has approved the grading of appliances into the three categories of 'obsolete,' 'non-current' and 'current' appliances. The 'obsolete' appliances are scrapped as they are returned to the stove works. The 'non-current' appliances broken down on return and any serviceable parts retained and placed into stock to provide replacement parts for any such appliances still in use. The final group, 'current' appliances, then remain for potential renovation; most of these are renovated by the department, the great bulk of them being cookers, which for renovation purposes are divided into the two main categories of enamelled cookers and black cookers. The enamelled cookers are taken apart, degreased, reassembled and tested, new parts being fitted where necessary. Approximately 200 enamelled cookers per week are dealt with in this way.

Black Cookers

The black cookers are dealt with in a different manner. First, they are placed in an oven to burn off the grease and then taken apart. The parts are then sent to specialised firm of vitreous enamellers and are enamelled a mottled grey; on return they are re-assembled and the completed cooker tested and reissued. At present the stove shops are converting 400 to 500 black cookers per week into grey vitreous enamelled cookers. The experimental and development work and the line assembly handling has taken some time to develop and arrange, and tribute must be paid to the stove department for producing the high weekly output.

In addition to cooker renovations, which is the basic load, the stove shops repair and renovate a large variety of appliances—*i.e.*, refrigerators, fires and radiators, and the various types of water heaters and many miscellaneous items such as wash coppers, etc. After renovation all appliances are tested to conform to the standards laid down by the Board.

The shortage of labour stands in the way of increasing the output of renovations from the shops, and ways and means are being constantly examined to find other methods to increase still further the output. In view of the labour shortage at Harwood Terrace and Haggerston, two small repair shops that were part of the Commercial and North Middlesex undertakings have been maintained for minor repairs, under the direct supervision of district managers. The manager of the stove department is available to advise on production methods and standards of renovation, for which he is ultimately responsible.

Meter Department

Another service department similar in function to the stove department is the meter department. Prior to nationalisation the Gas Light and Coke Company had a large meter department at Pound Lane, Willesden, responsible for stocks, issues, and repairs of all meters on that Company's area. On nationalisation it was decided to make the meter department responsible for all meters on the Board's area, the meter repair shop which existed at Stepney in the Commercial district being maintained under the general supervision of the manager, meter department, as a subsidiary repair shop to Pound Lane.

From the main store the meters are redistributed to local depôts in the Board's area for installation in consumers' premises. Approximately 200,000 meters are issued each year and 190,000 meters are returned annually from consumers' premises. The unrepairable are broken up and sold to scrap metal merchants; meters only requiring adjusting or minor repairs are repaired in the meter shops at Pound Lane. Meters requiring more extensive repairs are either repaired at Stepney repair shop or repaired by the manufacturers. All meters repaired at Pound Lane or Stepney are tested and then submitted to the Government Meter Testing Offices for official re-testing and re-stamping. Repaired meters provide approximately 40% of the Board's annual requirements.

Mr. Gooch concluded by paying tribute to the loyalty of employees in all the service departments. However well a service organisation was planned and organised a full service could not be achieved without the complete co-operation and zeal of every employee. Full credit must, therefore, be given to all employees in the service departments of the Board for the service that they offered and the successes and economies that the departments had undoubtedly achieved.

Factory Party.—On November 29, the Jarrow factory of George Wilson Gas Meters, Ltd., held its annual party, which was attended by all the Directors. It was the largest party so far held, approximately 120 people being present. After a few words of appreciation of the manner in which the works had functioned since its inauguration, the evening was devoted to a concert given entirely by employees.

CONSULTATIVE COUNCILS IN SESSION

Northern Price Increases Challenged

Mr. Crowther Replies to Protests

PROTESTS against gas price increases in the Stockton and Penrith Divisions were voiced by deputations from West Hartlepool Borough Council and Penrith Urban District Council at a meeting of the Northern Gas Consultative Council at Newcastle on December 4.

After hearing the protests and the answers in each case from the Chairman of the Board, Mr. E. Crowther, the Council decided by 11 votes to one that the Board was justified in its proposed increases in the Stockton Division, that the Board's action conformed with its published statement of policy of October, 1949, and that no further action could be taken. It was decided to discuss the Penrith protests at the next meeting.

The West Hartlepool case was opened by the Town Clerk (Mr. E. J. Waggott) who said that in his Council's opinion the increases were very severe and bore no relation to increases in other parts of the area. He said they knew that in the same Division there was one authority (Billingham) which was to have a reduction in gas prices whereas West Hartlepool would be affected by increases of up to 70%. Until Vesting Day West Hartlepool had its own gas supply and it was run economically without any loss. Because of this the town was at a loss to understand why its people were being asked to bear such heavy increases.

'We think the way in which the new prices were introduced to the public was grossly misleading,' he declared. 'The people of Hartlepool were led to believe that the increases would be from 11d. to 1s. 1d. but in fact the increases will be about 70%. It was wrong for the Board to introduce the increases in such a way in that it failed to give the public the fullest insight into the effect they would have.'

Income from Domestic Consumers

Councillor T. P. Everett said he did not believe the Board realised what a large amount of its income came from domestic consumers. The Hartlepools Gas and Water Company encouraged the installation of gas appliances during the past few years before nationalisation and by giving favourable rates they were extremely successful. One householder who used 218,000 cu.ft. of gas in the quarter ended March, 1950, was charged £23 16s. 5d. but it is proposed that his charge be increased by a fur- £15 13s. 8d., an increase of 65.8%.

He cited other cases. one of which was a business man who last year was charged £66 for gas consumed in his home and £8 for his office. Under the new tariffs the charges would mean an additional £45 for his house and £54 for his office.

'We don't see why we should suddenly be asked to pay this considerable increase without expecting anything in return,' he continued. 'We cannot see how the charges are justified. Shipyards and engineering works in the town are large users of gas and they will have increases in the region of 50 or 60%. These increases will have to be passed on to their customers and it is hardly going to help the export drive for them to write to their clients overseas pointing out that prices are continuing to rise. We do not think the town's industries should be called upon to pay so much. One company with which I am associated is going to have a gas bill of £800 a year more than usual and that money will be paid at the expense of the firm's export trade in the long run. We will perhaps modify our attitude if the Board can give us a reasonable and sound argument as to what West Hartlepool is going to get out of the increases.'

'Townspeople Staggered'

Councillor T. W. Pinkney declared that the townspeople were staggered by the increases, and another member of the deputation said they were not only perturbed; they were alarmed.

Mr. Crowther replied by pointing out that when the price increases were first set before the Council he stressed that they would not be universally popular. The proposals were equitable and it was not any fault of the Board that its expenses were such that the increases had to be made. As a consumer himself he would have an increase of about £15 a year for his gas account at home. He said he deprecated the remarks which had been made in some quarters that the increases were the result of the Board spending money on such items as extra staff. That was not true and it was most unfortunate that such statements had ever been voiced.

In the first year of its work the Board's output and accounts, and, in fact, everything it had done, compared very favourably with other Boards in the country. As the new prices will not have been in force for a full 12-month period next year a deficit was to be expected on the year's trading. As it was it was going to be very difficult for the Board to manage on the additional income to be derived from the increased charges, and these increases had been kept as low as possible.

'The criticisms which have been made here today largely turn upon the application of the Board's policy in the application of gas prices which the Chairman (Alderman Hoy) reminded this Council a short while ago were given the widest possible publicity,' continued Mr. Crowther. 'It was then stated that the Board did not think it desirable nor did it intend to unify prices throughout the area. I am encouraged in my belief that the Board has gone a long way towards achieving equity when some of the criticisms cancel each other out. Some authorities such as West Hartlepool dislike the idea of sharing their advantages with those less fortunate. It may, however, interest the Council to know that the North Thames Board has made all its prices the same. The Northern Board rejected the idea as illogical for this area after giving it careful consideration.

'One main complaint of the West Hartlepool deputation is that the new tariffs bear most heavily on the larger consumers whereas, in my experience, complaints from some areas have been exactly the opposite. This Board does not see it as its duty to discriminate between two neighbouring authorities such as West Hartlepool and Stockton. The gas price in Stockton was lower than that in West Hartlepool pre-war and there were some very peculiar circumstances in the latter town. Its gas company adopted a policy which left a very difficult situation for us.'

He said they made a contract with the proprietors of coke ovens for a supply of gas, very cheaply, and in a quantity which was about 50% more than they required. The company sold the gas cheaply and were so successful that they were eventually selling more gas than the coke oven contract could supply and they had therefore to bring their own plant into production. This supplied gas at a steadily increasing pace with the result that instead of making small profit on sales as at first they were running at a substantial loss. 'I am perfectly sure that had it not been for the imminence of nationalisation they would have made quite radical alterations in their charges twelve months before vesting day. But they left someone else to do this,' said Mr. Crowther. 'The Hartlepool Company could not have continued at their level of consumption, not even in 1949. During the first few months of 1949 before they handed over their undertakings they were giving them a great deal of anxiety, and the past few years' sales made substantial inroads into their profits.

Sharing the Benefit

'The Board has decided that some of that coke oven gas will go to the Hartlepools and some of it to other areas so that they can share its benefits. Stockton is just as much entitled to its share of these benefits—the very cheap gas. This is a necessary consequence of nationalisation.'

Mr. Crowther stressed that it was human nature to look upon the increases from the percentage viewpoint but he asked that they consider them from the angle of the actual prices. The prices for Hartlepool unit were not excessive. The increases meant that townspeople there would pay 13½d. for the first 30 therms and large consumers would pay 7.6d. a therm. The rate for consumers in the North Thames Area was 16.1d. a therm and that did not include the rentals of meters. There was an alternative scheme which entailed a reduction of one-third of the price after the first 30 therms. He said that while

their circumstances were different their prices were much higher. Hartlepools' prices fell into insignificance by comparison for they were extremely low.

'If the Hartlepool Gas Company had carried on for long in ownership they would have been hamstrung by their own success,' he said. 'They would have had to deal very drastically with the situation and there is no doubt at all that the gas prices they would have had to charge would been several times as high as the prices paid for the coke oven contract.'

He did not think that instances quoted by Councillor Everett were typical of domestic consumers for he contended there would be very few in the area who would consume 218,000 cu.ft. a quarter. He sympathised with Hartlepool consumers but wished them to realise that their gas prices would have been increased whether the industry had been nationalised or not.

Mr. Waggott expressed dissatisfaction at Mr. Crowther's answer. Councillor Everett said he did not think the deputation had been given a satisfactory explanation. The townspeople lived on a coal field and had coke ovens nearby. They therefore expected that the commodities on their doorstep should be cheaper to them than to people in London. He suggested that the average increase to every Hartlepool consumer would be 45% and they did not think this was justified.

'If the Board knew at vesting day that prices were to be increased they should have come clean about it at once and not encouraged people to have more gas appliances in their homes.'

Leading the deputation from Penrith, Mr. I. G. Sim, chairman of Penrith Gas Consumer Committee, said his complaint was that charges had gone up out of all comparison to those for other units in the area of the Board. The town itself had always been able to pay its way with its own gas supply. They were now asked to pay the largest increases of any place in the Board's area, this being an increase from 4s. 9½d. per 1,000 cu.ft. to 7s. 1d. Hartlepool's increase for each 1,000 cu.ft. was merely from 4s. 5½d. to 5s. 3½d.

The tariffs boiled down to the fact that small consumers were to pay £2 to £3 a year more for their gas, and he thought it was a wrong policy for a publicly-owned undertaking to lay its heaviest burden on the weakest shoulders. He advocated a flat rate for all domestic consumers in the Board's area so that no single area could think it had been singled out for 'savage treatment.'

A Well Run Undertaking

Mr. Crowther told the Penrith deputation that they had given a very well run undertaking to the Board and it was expected and hoped that it would continue to run successfully in every way. The average consumer at Penrith took about 200 therms a year and the average increase would be in the neighbourhood of 2½d. a therm a year. While it was true to say that there was a very considerable increase on the first 30 therms consumed there was not any increase on amounts used above that. In addition, the Board had removed the meter rent in order to ease the burden on consumers. He cited many other areas in which the Board was asking the same prices as in Penrith and many of them were in a geographically better position than Penrith. 'If you consider the actual prices and dismiss from your mind the relationship between old prices and the new I think you will see that Penrith is not being penalised,' added Mr. Crowther.

'What you are doing is taxing the children's meals by taxing housewives' gas ovens,' declared Mr. Sim. 'In view of what I have heard and seen here today I feel that I should ask the Chairman to consider inviting the Press to our future meetings of the Consumer Committee in Penrith,' he added.

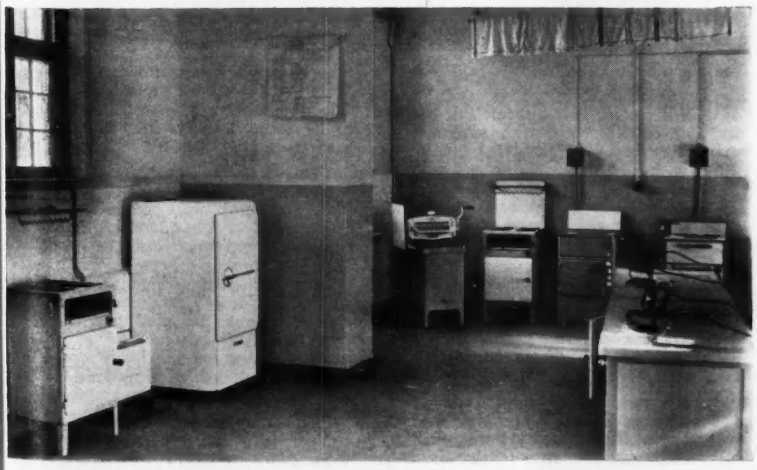
Alderman P. M. Williams, a member of the Consultative Council and a member of West Hartlepool Town Council, said that he had no idea until recently what the new gas charges would entail for the average consumer. 'I am not entirely satisfied with the Chairman's answer because I have to go into the Hartlepools and speak to people who are to pay these high increases and it will be no good me speaking about what people in the North Thames area pay,' he said. 'I heard nothing in Mr. Crowther's statement which justified the increases in Stockton Division.'

He moved an amendment that the Council ask the Board to review the charges in the Hartlepool area in view of 'the excessive increases large consumers are being asked to pay.' Alderman Williams was the only member of the Council who did not vote for the motion that no further good could come of investigating the West Hartlepool complaints.

Alderman Joseph Hoy, Chairman of the Council, said it would be wrong indeed for any member of the Council to attempt to make out a case that Mr. Crowther had deviated in any way from the statement he made to the Council at the time of the price increases coming before it.

'It is a weak argument for any member to say that he was not aware at the time what the price increases envisaged. We were warned that there would probably be repercussions from the public, and the prices were widely publicised. We accepted the increase and felt that we were armed sufficiently to meet any criticism. I would say that the deputation from West Hartlepool has not made out a case upon which they could ask the Board to reconsider their charges,' declared Alderman Hoy.

MODERN FUEL FOR MODERN DOMESTIC SCIENCE CENTRE



OPPORTUNITIES for the younger generation to become fully acquainted with the operation of gas appliances, and to prove for themselves the qualities of gas as a competitive fuel, are now available at the domestic science centre which has recently been extended and modernised at the Ramsey (Hunts) Abbey Grammar School.

When the Ramsey District of the Eastern Gas Board learned of the proposed developments, consultations took place with the Headmaster and the Cambridge divisional organisation, which agreed to provide and maintain the following appliances for educational purposes: One 'Newhome' and two Radiation 4180 cookers; one L.450 Electrolux refrigerator; a Dean 10 gal. washing machine; two Radiation flow irons; and two G.L.C. irons. These are in daily use and make a valuable contribution to the equipment at one of the finest domestic science centres in the country.

Messrs. Electrolux, Ltd., also provided charts illustrating the construction and operation of the gas refrigerator, one of which is in the chemistry laboratory.

Institution of Gas Engineers

First Meeting of Manchester Section

THE first meeting of the newly constituted Manchester and District Section of the Institution of Gas Engineers was held in the Engineers' Club, Manchester, on December 5, with Mr. N. G. Appleyard, General Manager, Leeds Group of the North Eastern Gas Board, in the chair. The meeting, which was very well attended, was preceded by a luncheon, and afterwards Mr. W. H. B. Porter, Distributing Engineer, North Western Gas Board, gave to the members a summary of his paper 'Reconstruction of a Distributing System.' An interesting and lively discussion on Mr. Porter's paper followed.

Opening the meeting, the Chairman expressed his pleasure at the large number of members present and said how pleased they were to have with them Mr. H. Butters, Member, North Western Gas Board, Mr. A. McDonald, Member, North Eastern Gas Board, Councillor C. E. P. Stott, J.P., Chairman, North Western Gas Consultative Council, and also Mr. S. G. Deavin, Secretary, North Western Gas Board, along with distribution engineers from various groups in the North Western and North Eastern areas.

After reading apologies for absence, the Hon. Secretary, Mr. A. H. Nicholson, read the minutes of the final meeting of the former Manchester District Association of Gas Engineers. Mr. F. G. Shaw proposed that they be accepted and Mr. McDonald seconded the proposal. The Secretary also read a letter received from the Council of the Institution of Gas Engineers confirming the appointment of first officers and the Management Committee.

Members were asked to be upstanding to the memory of the following members of the Association who had died during the past year: F. G. Brockway (1925), Cleethorpes; J. T. Broughton (1901), Haslingden; A. L. Holton (1922), Manchester; H. Greenwood (1946), Halifax.

Officers, 1950-51

Chairman: N. G. Appleyard.

Senior Vice-Chairman: Thos. Haworth.

Junior Vice-Chairman: Alex McDonald.

Hon. Secretary: A. H. Nicholson.

Hon. Treasurer: J. H. Clegg.

Management Committee: J. Grayston, W. S. Hubbard, W. Deardon, J. Castle, R. Halkett, A. L. Higham, R. L. Greaves, H. Johnston, J. Tilley.

Hon. Auditors: J. H. Richmond, A. F. Yates.

The gift of a President's Medal by the late Mr. A. L. Holton was suitably acknowledged.

Presentation of Higher Grade Certificates was then made by the Chairman.

Reconstruction of a Distributing System

In presenting his paper, Mr. Porter explained that it was intended to stress the vital need for a detailed investigation into potential demand, so that the gas industry might provide the requisite production and distribution capacity in advance. The time needed for the installation plant would determine the minimum forward forecasting of demand necessary. This type of information, which was so essential for planning, must obviously be continuously kept up to date. In addition to direct contact with consumers, it had been found from dealings with the town planning authorities that they had a fund of extremely useful information which was readily made available to the North Western Gas Board.

It was found that in almost every town in this country there were districts where the pressures were unsatisfactory, and/or there was development to take place which would require some form of distributing reinforcement. The Chester district, for instance, was inadequately supplied at the moment and appreciable development was to take place. The paper contained as much detail as possible of the investigations which were carried out to determine a plan of reconstruction for the Chester system.

It was considered to be sound policy to design the major improved scheme in accordance with the carefully estimated 1970 loads, and subsequently to carry out the immediate minimum requirement. This procedure avoided burdening existing consumers with annual charges on capital not immediately required; in addition, the trend of local growth which was at present envisaged could be checked against fact so as to make doubly sure that a second stage of the major reconstruction plan was sound.

The assessment of compression costs of a grid system was difficult since loads and consequently pressures varied from season to season. It was much more difficult, however, to assess the cost of gas compressed through a peak load pressure system which was in parallel with a low-presure system. The appendix attached to the paper gave an estimate of the quantity of boosted gas supplied through a proposed I.H.P. feeder and then estimated the pressures required, all with a view to arriving at the compression running cost for selecting the economic major reconstruction scheme.

It was stated also in the paper that gas pressures in parts of many districts were below the statutory minimum, and that there must be an intensive drive to eliminate this disservice to consumers. It was necessary to give volume, quality, and pressure on tap to the public; and to enable this to be done the Board must be continually extending and reconstructing its production and distributing plant. With present deliveries of materials such work took two to five years, and it followed that they must introduce surveys of the potential to provide for the increased demands of the next five years, as an absolute minimum.

Gas sales had increased, in round figures, by 70% since 1939. It was necessary now to anticipate demands and give the requisite pressures at all development stages. This would entail a continuous liaison with the town and country planning authorities, and all consumers.

Towns Over-Spilling

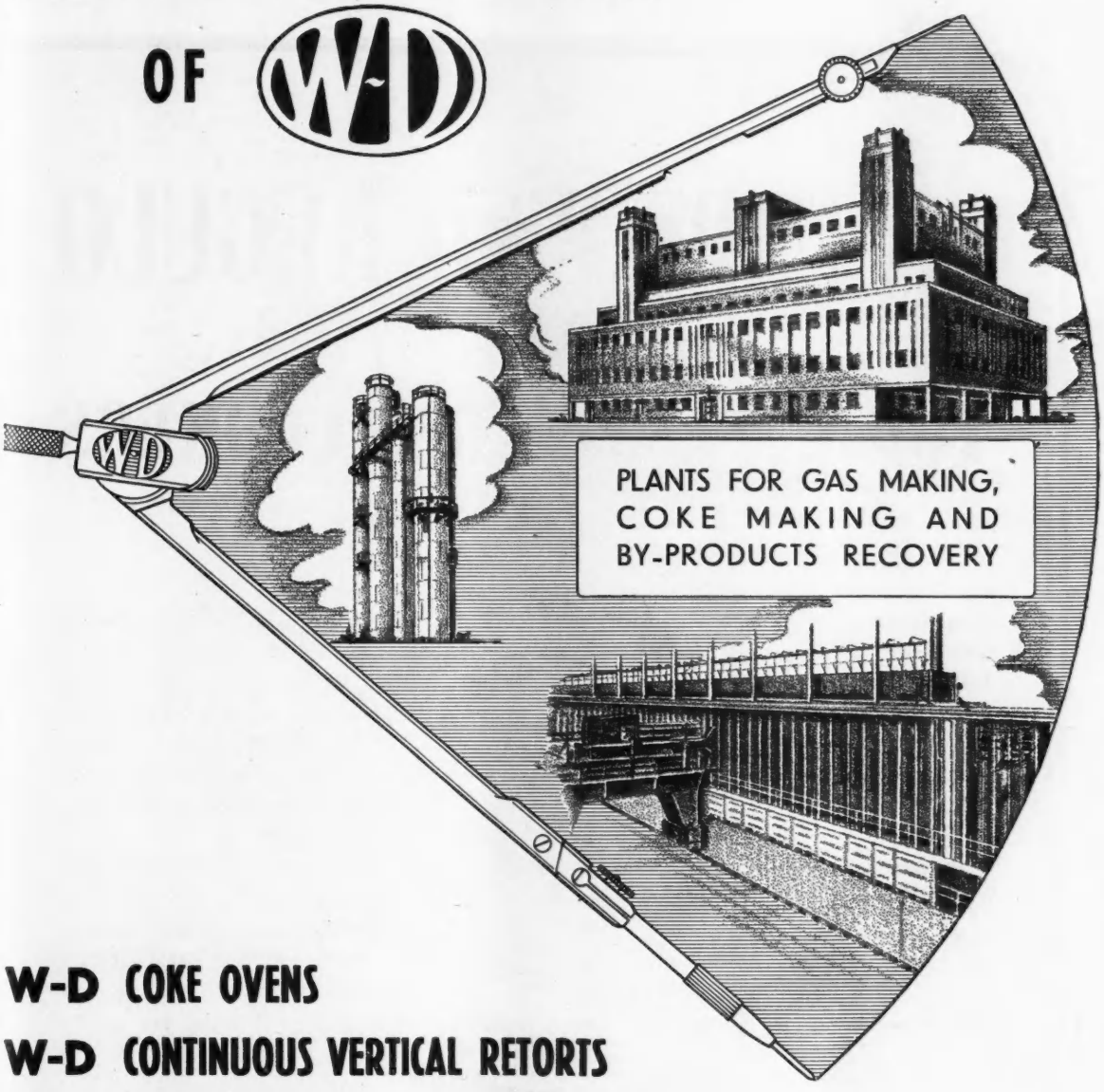
The planning authorities were reducing housing densities of existing areas by slum clearance and also by segregating industrial premises to defined zones. In consequence, towns were over-spilling into adjacent rural areas, and, as a result, distances for gas transmission were increasing. Specific programmes for development had been prepared, and for most districts the planning authorities had considered more than a 10-year period of development. It was fully appreciated that long-term assessments could be misleading, but invariably the initial five-year period of development could be taken as reasonably accurate. This valuable information was available to the Board, and none of the reconstruction work would be sound without reference to those data.

Gasworks or holder storage stations in towns and cities in this country were usually centrally located in the built-up areas. The original idea had been to supply adjacent consumers at relatively low pressures and to keep the lengths of mains as short as possible. Many of these old mains were still in commission today. It was frequently found that there had been no new feeder main laid through the streets for 30 years or more, despite the considerable increases in outputs during that time. Unlike other plant which was above ground, gas mains had not been renewed regularly at short intervals; they were generally unsuitable for use at pressures above 12 in. w.g., and they could not be converted to pressure feeders to carry larger volumes. The change in traffic conditions and the improvement in road surfaces had significantly increased main-laying costs in towns. There had also to be taken into consideration the congestion of public utility services in roads with high density of properties.

It was known that many local distributing systems were completely inadequate, and a considerable amount of capital expenditure would be needed for new distributing plant to make available a first-class service to all existing as well as future consumers. The money would have to be used prudently, and the rule of thumb method of selecting main sizes for guessed loads would have to be superseded by economic design—sizing of mains for known demands.

Road conditions, load densities, and conditions of existing mains might vary from place to place. Therefore there

WITHIN THE COMPASS OF W-D



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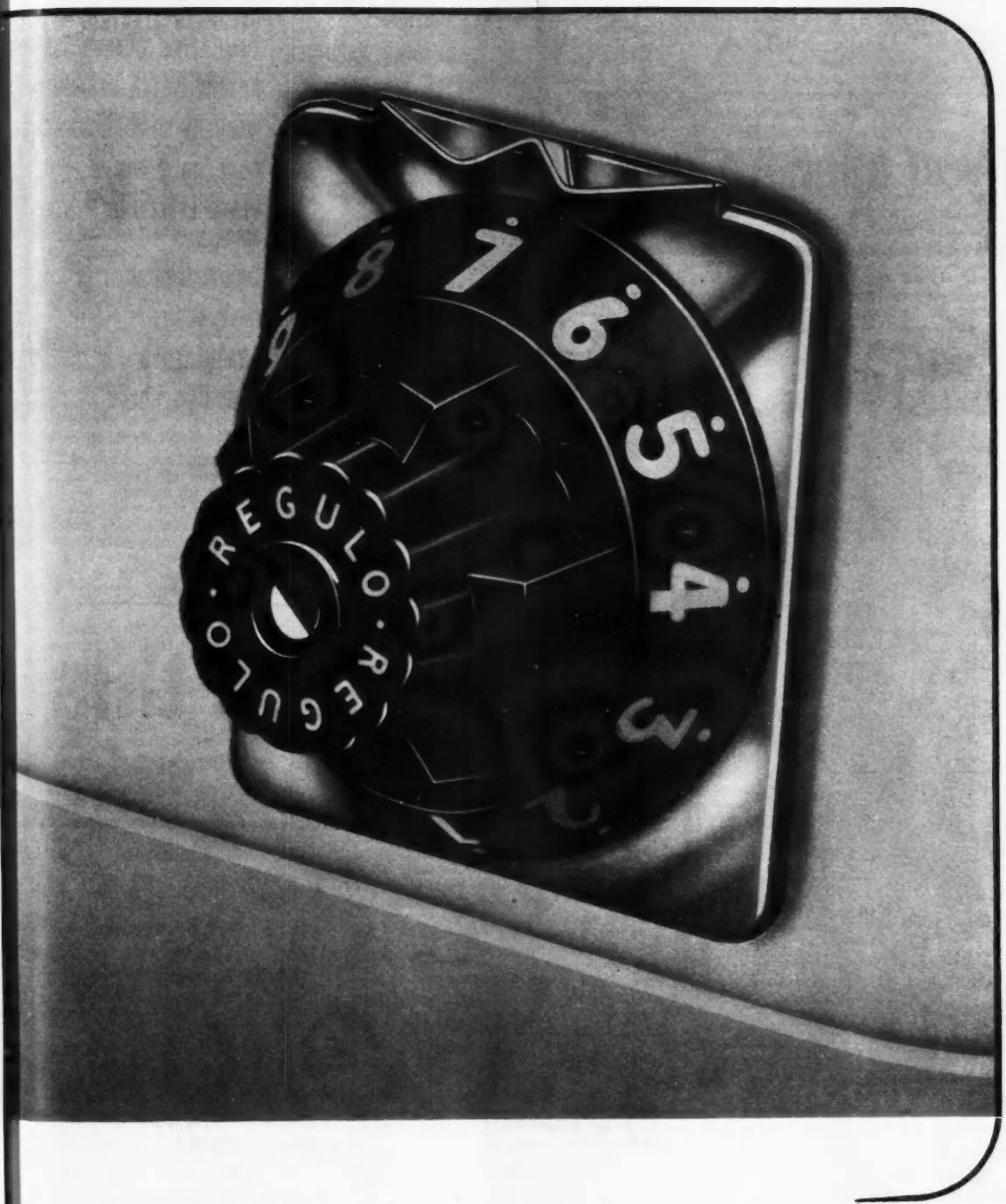

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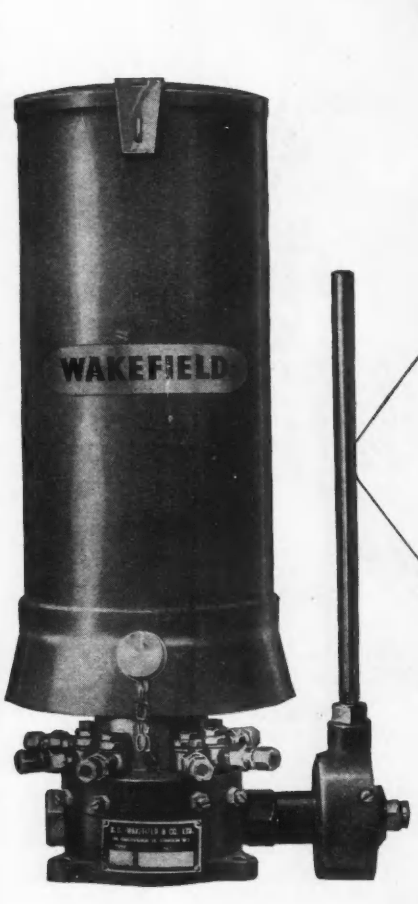

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was no standard formula for reconstruction work, and each locality must be the subject of a special and individual investigation. There was, however, a common approach to all such problems, as follows:

1. Detailed survey of potential demands.
2. Selection of the most economic way of providing for increased demands.

When discussing the subject-matter of the paper with the author, Mr. Appleyard felt that it would be of greater interest to the members if it was allied to a particular investigation, and the City of Chester, with the surrounding rural area, was used as a typical case.

The district selected for consideration was the southern part of the Wirral Group, including the City of Chester, Hoole Urban District, and the adjacent rural areas in Cheshire and Flintshire. The River Dee divided the district into two parts, of which the northern portion was the greater and contained shopping and market centres serving a wide area.

Direct contact was made with the three local planning authorities—namely, the Cheshire and Flintshire County Councils and the Chester City Council.

The City was the County Capital and a large number of the inhabitants were engaged in administration, commerce, finance, and transport. There were good recreational facilities in the vicinity, and Mr. Porter stated that it was not intended to attract other than a small percentage of light industries, for which purpose relatively little acreage had been allotted.

As far as design work for main-sizing was concerned, it was necessary to know where the gas was required, and large districts were broken down into smaller sections for loading calculations on the feeder mains. This procedure was usually called point loading, and when designing subsidiary feeders the various sections should contain no more than 200 houses. In the case of Chester the intention was to define the major reinforcement needs, and the district was sub-divided into 67 sections of which five were scheduled as open spaces reserved for agriculture.

There were three principal types of residential property in the district—viz.:

(a) Up to £12 p.a. rateable value; the older cottage and terrace type.

(b) £12 to £40 p.a. rateable value; including practically all the council houses built since 1920.

(c) Over £40 p.a.; all the larger houses.

The present consumer saturation was 95%, and 90% was used for the future housing development.

A precise slum clearance programme has not yet been laid down, and it has been necessary to assume that any properties which were to be demolished would be replaced by equivalent gas consumers, either domestic or commercial. It was not expected that there would be an appreciable number of houses for demolition in the locality. Each shop with a flat above, or small lock-up shop, had been classified as equal to one domestic property.

In addition to maps of Chester and the district the paper included a great deal of information dealing with the domestic annual load build up at development stages north and south of the River Dee; the estimated total annual sales of gas at development stages in thousands of cubic feet, north of the river; and estimated total sectional annual sales at development stages in thousands of cubic feet, south of the river and estimated peak instant loads in the district sections at development.

In regard to the capacity of the existing system, the initial pressures at the gasworks were now 11.5 in. W.G. at peak period and 4 in. W.G. at night. The contour advantage was in no instance greater than 100 ft. in any part of the district. At several terminal points both north and south of the river the peak period pressure was below the statutory requirements. The supply was completely at low pressure.

Development had taken place at the perimeter, as was usual, and the only reinforcement feeder mains that had been laid down for many years were to the north-west and north of the gasworks. The total sales had increased from 314 mill. cu.ft. in 1920 to 883 mill. cu.ft. in 1949-50.

Wide Pressure Variation

The pressure variation was far too wide. The ratio of peak to night pressures was approximately three to one, and appliances set at the lower pressure would have some 70% higher gas rate at peak period. The expedient of raising initial pressures at the gasworks should cease as the upper safe and economic limit for a low pressure system had already been reached. The mains, and to a lesser degree the services, were not suitable for conversion to intermediate or high pressures by fitting governors to meter inlets. Further mains extensions would be needed to set right the perimeter supply, as well as to cater for the expansion of gas sales.

Experience gained had revealed the difficulty of laying mains even through selected parts of the town because of the narrow streets.

Mainlaying for other than essential repairs must be ruled out of the main traffic lanes of the city until a proposed ring road was completed. This road scheme might not be fully implemented for 10 years and the improvement scheme could not be deferred for that time. The Dixon Committee Report (Comm. 249 of the Institution of Gas Engineers) recommended a maximum pressure variation of 2 in. W.G. at consumers' meters. The author of the paper had heard the view expressed that this recommendation was over-liberal, but this criticism should receive no consideration until it could be said that the report had been implemented all round. Certainly a considerable amount of expenditure would be necessary for distributing plant before the maximum differential recommended in the report had been achieved.

To make due allowance for pressure drop through the service, meter, and internal installation, there should be 4 in. W.G. minimum in the service mains at any time of the day or night.

The use of sectional load assessments made it evident that there was a severe bottleneck in the vicinity of the gasworks. A short length of 30 in. main for the L.P. system would be necessary in order to rectify the deficiency. Even with this addition the existing L.P. feeders were not capable of supplying the whole of the city area at any development stage within a maximum pressure differential of 2 in. W.G.; the supply to the south was a worse case and only 37,000 cu.ft./hr. over the river at all development stages within the same pressure variation could be delivered.

A plan showing existing principal feeder mains for Chester and district was included in the paper, together with much detailed information respecting the capital cost of alternative feeder schemes north of the river, annual charges of alternative feeder schemes, capital costs, and annual charges of alternative feeder schemes south of the river, estimated running compression costs of alternative feeder schemes north of the river, estimated running compression costs of alternative feeder schemes south of the river. There was also included a map of Chester and the district showing the proposed principal feeder mains, a flow diagram, and much other information of a detailed and technical nature.

Towards the conclusion of his paper, Mr. Porter stated that it was intended that storage would be located at Chester gasworks, whether or not production continued at that works. The present production capacity of the site was 4½ mill. cu.ft./day, which was sufficient for the 1955 initial development load. Additional requirements would be produced in the northern part of the group.

The fundamental requirements of the responsible distributing engineer for ensuring adequate supplies after a reconstruction scheme had been started were as follows:

1. Continuous liaison with planning authorities and larger consumers should be maintained.
2. After a district had been sub-divided into sections, the actual annual sales progress in each of those sections should be examined and compared with the estimates. It was an advantage if the information could be prepared quarterly, and much time could be saved by discussing in advance the disposition of sections with the responsible accounts officer. Sight of this information showed load trend in different parts of the area, and any unusual change should be examined for effect on the pressure position.
3. Flow measurement of send-outs was essential, as it also established the demand trend, and could be used to effect savings in compression costs.
4. Surveys should be carried out in order to keep a watchful eye on district pressures.

The best routine procedure was to have a number of recorders spread out radially from the works or holder station to the extremities. The radial pressure survey should continuously rotate round the storage centre. The pressure surveys on I.H.P. feeders should be divorced from tests on the L.P. system.

Mr. **J. G. Tilley** (Huddersfield) proposed and Mr. **W. B. Thompson** (Wirral) seconded a vote of thanks to Mr. Porter for his paper.

ADJUSTMENT OF GAS BURNERS

PRESENT difficulties in the installation of plant to keep pace with the increasing demand for gas have led to a renewed interest in the effects of variation of gas composition on the performance of appliances and in the design and adjustment of burners. At a meeting of the London and Southern Junior Gas Association on December 8, Mr. E. E. Blandon, M.A., B.SC., and Mr. J. V. Rigg, both of the Watson House staff, North Thames Gas Board, gave a series of demonstrations illustrating these subjects.

Demonstration burners, specially constructed in glass, were used to show the explosion of gas-air mixtures, ignition, the speed and anatomy of flames, the design factors of a bunsen burner and the operation of its controls, the effects of gas composition, and the flame-matching burner.

Many of the demonstrations were of classical standing; but although they may be familiar to many as text-book descriptions, the actual practical illustrations presented by the authors must have been of considerable benefit in grasping the principles of a complex subject. The various equipment was originally assembled to illustrate a talk by Mr. E. W. B. Dunning to a conference of home service advisers last summer on the design of aerated burners; but a subject which could only be touched on in the previous presentation—namely, the effects of variation in gas composition on burner performance—was more fully treated by Messrs. Blandon and Rigg.

Of special interest is the effect the variations in the proportions of gas constituents have on a bunsen flame, which was demonstrated by adding in turn a little of each to the gas supply of the experimental burner. Hydrogen shortened the cone, but not very greatly. Carbon monoxide and nitrogen shortened it rather more. Ethylene appreciably lengthened it. These changes are referred to as 'hardening' or 'softening' the gas—a 'soft' gas being one that tends to give a soft, long-coned flame.

New Junior Section

The Wales and Monmouthshire Junior Gas Association, meeting at Aberdare on December 7, under the chairmanship of Mr. C. H. Singleton (Chepstow), decided to form a North Wales Section.

Mr. S. G. Meade (Newport) said that owing to the travelling difficulties between North and South Wales, the Association's Council had received an application from certain members in North Wales to form a section in the area which would formulate its own programme. The Association approved their Council's action in recommending the proposed section which would have a chairman, secretary, and seven committee members.

Mr. Meade estimated that the setting up of this new section would mean ultimately the Association's membership growing to 200. The Chairman of the Wales Gas Board (Mr. T. Mervyn Jones) had intimated that he hoped to attend the inaugural meeting of the section.

Tar Distillation Merger

An agreement has been signed by which the Litherland Tar Works of Brotherton & Co., Ltd., Leeds, chemical and dyestuffs manufacturers, becomes part of the co-operative scheme of Lancashire Tar Distillers, Ltd., of Manchester.

From January 1, the tar distillation business carried on at the works will continue under the complete control of Lancashire Tar Distillers, Ltd., in which company Brotherton & Co., Ltd., will become shareholders, and will appoint a representative to the board. The new arrangement concerns only the tar distillation business based on the Litherland works.

With the integration of gas undertakings in the area under the North Western Gas Board integration of the tar distilling interests in the area was only to be expected, and the present merger is an important step in this direction.

Danish Gas Company

The 96th annual meeting of the Danish Gas Company in Odense, on December 16, was preceded as usual by an informal meeting of the shareholders resident in England at the London office on December 12, at which the Chairman, Mr. E. C. Woodall, stated that the accounts showed considerable improvement over those for any year since 1939. The profit for the year ended June 30 was Kr. 210,976 (Kr. 19.36 = £1), compared with Kr. 5,447 for the previous year. In this sum was included Kr. 168,428 profit realised on the sale of property, and the Directors recommended that this should be distributed in the form of a 4% dividend for the year, leaving Kr. 62,886 to be carried forward on profit and loss account. A levy on the purchase price of coal in Denmark was removed in June, 1949, and at the same time the market price of coke rose, so that for the first time since the war the Company's operations have been conducted under conditions approaching normality, and the result of the year's working has shown considerable improvement. Reconstruction of carbonising plant is nearing completion. Much improved carbonising results may be expected only if supplies of good quality English gas coal are available. Since the close of the year under review exports of coal from England have been substantially scaled down and it is impossible to predict what quantities will be forthcoming in the future. Gas consumption showed a small increase. By agreement with the Odense Commune an industrial tariff was introduced.

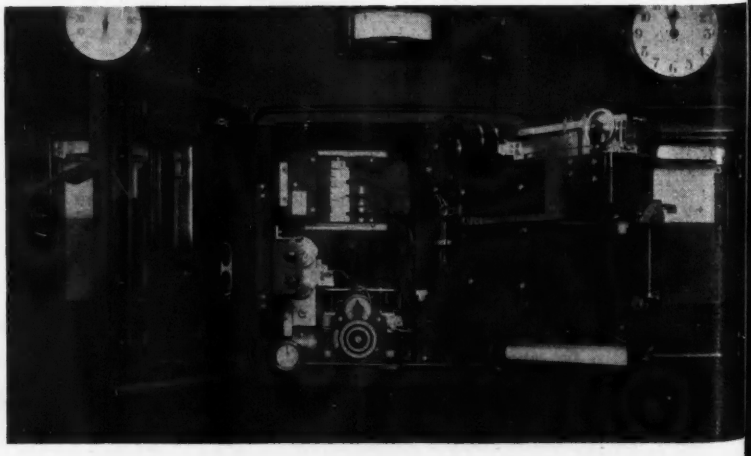
Sidney Flavel & Co., Ltd., announce a re-arrangement of area representation, as follows: Mr. T. Brook, Northern and North Eastern Gas Boards; Mr. H. W. Jackson, North Western and East Midlands Gas Boards; Mr. J. Flavel, West Midlands and Wales Gas Boards (Mr. B. D. G. Jenkins, who formerly represented the Company in Wales, is resigning at the end of the year); Mr. J. H. Fishwick, South Eastern, North Thames and Eastern Gas Boards; Mr. D. C. Foote, South Western and Southern Gas Boards.

AUTOMATIC CONTROL OF CALORIFIC VALUE

An Elliottronic continuous balance recorder incorporating an Elliottrol three-term controller has been installed by the South Eastern Gas Board at the Rotherhithe Yorks for the control of C.V.

The thermometer elements of a standard type of calorimeter are arranged as part of the bridge circuit of the instrument. A continuous chart record of calorific value is maintained; any deviation from the desired value produces an electrical signal which the trimode controller converts to a pneumatic pressure for the operation of motor diaphragm valves in the foul gas mains.

The apparatus, which has been in use for some months, has proved a satisfactory means of maintaining calorific value automatically between the allowable limits. Nevertheless, high and low limit contacts are fitted for the operation of an alarm relay should the automatic system be unable to meet exceptional conditions.



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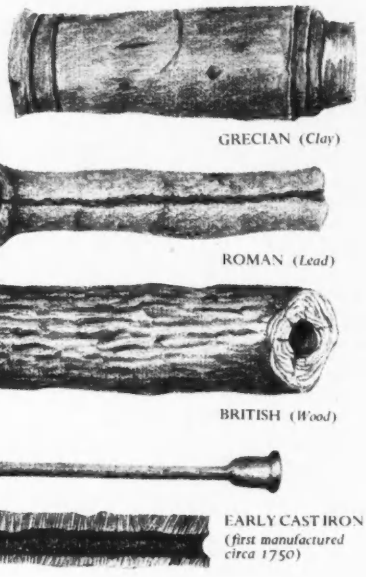

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Economy and Efficiency of

CARBURETTED WATER GAS PRODUCTION *

By F. SCANTLEBURY,

Devonport Unit, South Western Gas Board.

IN the process of carburetted water gas manufacture, economy and efficiency are not necessarily coincident, and determination at the point of thermal output of any particular plant at which the total cost of manufacture is a minimum depends on a wide variety of factors.

Each case is complicated by the fact that pre-war installations have to bear only about half the capital charges of the newer plants. Since 1939 the price obtainable for coke has quadrupled, the cost of oil has increased two and a half times, and the cost of steam production varies with every works, while maintenance charges vary with the amount of care and technical supervision the plant receives when operating.

Capital and labour charges being relatively high, the thermal output at which the lowest cost of manufacture is obtained, will always be near the maximum output of the plant, but considerable economy in raw materials—*i.e.*, coke and steam—may be achieved when the maximum thermal yield is not required. It would, of course, be ideal if the plant could always be operated at its optimum output, but this is impossible. In any case, the usual reason for installing this type of plant is the ease with which a wide range of thermal and volumetric outputs can be obtained.

Capital costs, of course, are a question of design and the original construction of the plant. Once these charges have been accepted, it is up to the individual engineer to obtain the best results from his installations.

Generally there is a tendency to ignore the flexibility in operation, and the consequent all-round saving, that the modern plant affords.

As far as blue water gas production is concerned, successful operation depnds on:—

(1) The ratio of the volume of air supplied during the blow to the weight of steam supplied during the run —*i.e.*, the air-steam ratio.
(2) The relative duration of the blow and run periods.
(3) The blast pressure.
(4) The depth of the fuel bed.
(5) The size of the coke.
(6) The operation of the self-clinkering grate.

If the air-steam ratio is lowered by increasing the quantity of steam supplied during the run, the average temperature of the fuel bed decreases—*i.e.*, the average temperature throughout the cycle, not the average temperature from the base to to top of the fuel bed. Hence the tendency to hard clinker formation decreases, with a consequent saving in maintenance charges. The heat in blow gases decreases, and by suitable adjustment of the steam supplied the quantity of heat in the blow gases can be reduced to that required to carburet the oil and/or maintain the plant self-supporting in steam.

If the extra quantity of steam supplied is correctly proportioned between up and back or down runs, no difficulties occur, as severe fluctuations in temperature conditions within the fuel bed are avoided. Should, however, the amount of steam supplied up or down through the fuel bed be misproportioned, wide fluctuations of temperature occur, large quantities of steam escape decomposition, and the quality of the blue water gas deteriorates, due to its excessive carbon dioxide content. When for any reason it is desired to make the plant self-supporting in steam, the air-steam ratio may be reduced until this is achieved or the carbon dioxide content of the blue water gas reaches 7%.

* From a paper to the Western Junior Gas Association, October 7, 1950.

The relative duration of the blow and run periods is of prime importance. The object of the blow is to store the heat required in the fuel bed, to support the subsequent endothermic steam carbon reactions during the run, and to heat the chequerwork of the carburettor and superheater to the required degree for the efficient cracking of the oil. From the commencement of the blow period, there is first a gradual, and then rapid increase in the carbon monoxide content of the blow gases, and unless the whole of this potential heat can be used to raise the temperature of the chequerwork of the carburettor and superheater, the economy of the process falls sharply. At any given blast pressure and weight of steam supplied, the blow should be as short as possible consistent with the above conditions being satisfied. While the quantity of heat in the fuel bed is vitally important, the temperature at which it is stored is none the less so. It is useless to expect a large quantity of fuel at a comparatively low temperature efficiently to decompose the steam supplied, as the percentage decomposition falls very rapidly when the temperature of the coke falls below 900°C. Likewise, a small quantity of fuel at a high temperature is equally ineffective, due to the reduced time contact. Under these conditions, therefore, it is not surprising to find that the carbon dioxide content of the blue water gas rises somewhat rapidly as the run proceeds.

Greater Heat Storage

It is, of course, possible to store a greater quantity of heat in the fuel bed by increasing the duration of the blow, thereby shortening the run. This necessitates a higher rate of steam supply if the output is to be maintained, resulting in reduced time contact. Less steam is decomposed, and the limited heat exchange in the upper zones of the fuel bed causes the run gases to leave the generator at a higher temperature. While the output may be maintained by this method, coke and steam consumption is increased.

Let us consider a specific case. On a 2½ mill. plant 10,000 therms of C.W.G. at 450 B.Th.U. may be produced by operating the plant either with a blow period of 30% for 24 hours, or for 16 hours with a blow period of 45%. Under the former operating conditions, the coke consumption is 3 lb./1,000 cu.ft. of C.W.G. less than when operating with a blow period of 45%. The saving over a day's working would be approximately 3 tons of coke, or at today's market price (85s. per ton) the monetary saving would be £12 15s. To be set against this, however, are increased labour charges —viz., two men shifts or £2 2s.—and the net saving is £10 13s. It is hardly economic to operate with a longer blow period than is absolutely necessary, especially when it is also remembered that to obtain the high calorific values usually required today from a carburetted water gas plant high rates of oil injection are required. The longer the blow period, the shorter must be the run, and hence the oil injection period. This is even more the case on a modern set using the back-run process, limiting oil injection to the up-run. When the rate of oil injection is high, it becomes increasingly difficult to obtain complete oil evaporation from the chequerwork, and with the longer blow the oil efficiency falls rapidly. The decrease in the quality of the blue water gas with the longer blow, due to the increased rates of steam supply, will also require more oil per 1,000 cu.ft. of blue water gas, in order to maintain a given calorific value, and one therm of oil gas costs almost twice that of one therm of blue water gas.

The output of a plant may be most effectively increased,

both economically and efficiently, by increasing the blast pressure. By this means a greater quantity of air is passed through the fuel bed per unit time, and the increased velocity of the blow gases through the incandescent coke reduces the amount of carbon monoxide formed in the upper zones of the fuel bed, though the formation of excessive potential heat is most effectively controlled by the weight of steam supplied during the run.

To obtain the maximum output from the plant, the blast pressure should be increased until further increase is prevented by the formation of clinker on the grate and/or the blowing-over of fuel from the generator. In America much higher blast pressures are used, up to 50 in. W.G., and the run period is continued until, according to our standards, the carbon dioxide content of the blue water gas is extremely high. But in America the price of enriching oil is not so important. In fact, oil gas therms in the U.S.A. are cheaper than blue water gas therms.

Where clinker formation is the limiting factor, the greatest output—that is, the highest blast pressure—can only be obtained when the air steam ratio is reduced until the heat in the blow gases is just sufficient to meet carburetting requirements.

Depth of Fuel Bed

Considering now the depth of the fuel bed, it is an old argument that by using a shallower reaction zone considerable economy is achieved by reducing the carbon monoxide content of the blow gases, this being due to the reduced time contact of the carbon dioxide with the hot coke. Decreasing the depth of the fuel bed is, however, accompanied by other effects which tend to counteract this reduction in heat losses from the generator. With the shallow reaction zone there is first a reduction in the carbon monoxide content of the blow gases, though this is not as great as may be expected, for with less fuel the generator must attain a higher temperature, thus improving conditions for the reduction of carbon dioxide to carbon monoxide. With less fuel there is a reduced time for heat exchange in the higher portions of the generator. Consequently the gases leave at a higher temperature. Generally, though, there is a saving due to the reduction in the potential heat leaving the generator. This is more than counterbalanced by the increased losses as sensible heat. Also, with the shallower reaction zone the decomposition of steam is adversely affected. If for any reason there is a temporary fall in the temperature of the superheater, a slight reduction in the depth of the fuel bed is an easily effected means of restoring the balance.

The effects of the variation in the size of the coke fed to the generator is interesting. The thermal yield per 1,000 lb. of coke decreases with the size of the coke. Although the decrease in yield is not appreciable for the sizes over 1 in., the decrease is most marked below this size. The smaller coke increases the resistance of the fuel bed. In consequence, at any given pressure of blast, the volume of air passed through the fuel per hour is decreased. The quantity of heat stored in the fuel bed varies with the quantity of air supplied (providing that the carbon monoxide content of the blow gases is adjusted to suit requirements, by regulation of the steam supplied during the run). Hence, with the smaller coke and the increased resistance, the output of the plant falls. Output can, of course, be maintained by increasing the blast pressure. Such increase is, however, with most plants limited by the blower plant and/or the water seals of the grate. Even if the blast pressure is not limited, the dense fuel bed concentrates the carbon to carbon dioxide reaction in the base of the fuel, and the resulting intense heat is bound to cause clinker trouble and a consequent increase in maintenance charges. With the smaller grades of coke a lower thermal yield per 1,000 lb. of coke is inevitable. A decrease in the output of a plant can very often be traced to a poor quality and badly graded coke or a coke that has been mishandled after grading. It is not sufficient to supply the best quality coke to the water gas plant. The important point is to see that the coke reaches the generator in first class condition, free from breeze and smalls.

When using a well graded large coke, 85/90 therms per 1,000 lb. coke should be obtained if the process is efficient. This is equivalent to 33⅓/35⅓ lb. of coke per 1,000 cu.ft. blue water gas of a colorific value of 300 B.Th.U. When, however, the maximum output is not required, the use of a smaller coke may be justified, providing that it has a lower monetary value. Using a smaller and cheaper coke at 75s. per ton, the output from the plant may be reduced to 83.4% before the blue water gas therms cost more for coke.

Reducing the output from the plant increases the capital and labour charges per therm for the size of plant under consideration (2¼ mill. cu.ft. at 450 B.Th.U.). At an output of 83% the increase in labour charges per therm of blue water gas amounts to 0.104d., while the increase in capital charges per therm is 0.083d., or a total increase of 0.187d. per therm, and there will be no monetary saving if the output of the plant is reduced, by the use of smaller coke, beyond 86% or approximately 77.5 therms per 1,000 lb. of coke.

When the self-clinkering grate is operated at slower speeds there is a smaller loss of carbon in the ashes and clinker. Considerably more important, however, is the fact that a greater proportion of steam may be supplied on the back-run, due to the greater stability of temperature conditions in the fuel bed. The supplying of a greater proportion of the total steam on the back-run leads to a more even distribution of the reactions, stabilises temperature conditions to an even greater degree, a higher percentage of steam is decomposed, and a better quality blue water gas is produced.

By increasing the steam on the back-run from 35% to 50% an improvement in output of up to 12½% can be obtained, while the coke consumption per therm may be reduced by 1.41 lb. This amounts to a saving in coke of 0.64d. per therm, while capital and labour charges are reduced by 0.108d. The total saving is 0.748d. per therm.

When operating with only 35% back-run steam the plant is working well below maximum efficiency, as only 76 therms/1,000 lb. of coke are obtained.

Heat Losses Reduced

By increasing the back-run steam, additional heat is returned to the generator from the superheater and carburettor. This additional heat is insufficient to account for all the gain in output, as the total heat of steam superheated to 730°C. is not appreciably greater than dry saturated steam, at the pressure supplied. The majority of the gain must be attributed to the blow and up-run gases leaving the generator at a lower temperature, and a greater proportion of the blue water gas leaving the base of the generator. Thus, the heat losses from this vessel are reduced, more being retained for the decomposition of steam. With the slower grate speed, less steam is required to control the heat in the blow gases; the improved quality of the blue water gas will require less oil to maintain a given calorific value; the yield of blue water gas per 1,000 lb. of coke is improved, and the output of the plant is increased. The degree of the reduction of the speed of the grate will to a large extent depend on the percentage ash content of the coke being used, for, of course, a point must be reached when the accumulation of ashes and clinker on the grate disturbs conditions in the fuel bed. Large masses of clinker will cause the gases to channel through the fuel bed; there will be less carbon dioxide in the blow gases; the gases will leave at a higher temperature; and the thermal yield and output fall.

The distribution of heat, when obtaining a given thermal yield, or using a given quantity of coke, is perhaps the best way of determining the points at which a saving in fuel may be achieved or the output of the plant improved.

To produce one therm of blue water gas requires that 4.86 lb. of carbon are gasified in the steam during the run. This figure is to all intents and purposes constant, irrespective of the quality of the blue water gas, providing a normal coke

is used. If the coke used contains 11.7% ash, 413 lb. of carbon are gasified per 1,000 lb. of coke to produce 85 therms of blue water gas, leaving 470 lb. carbon to produce the heat required for the process. Allowing losses due to carbon in ashes and fliers to be equivalent to 43 lb. of carbon, the total heat required must be obtained from 427 lb. of carbon. This quantity, when completely burnt, will product 62.6 therms. This amount of heat must be used up as fully as possible in the process if the cost of manufacture is to be reduced to a minimum. The following figures show the therms absorbed per 85 therms of blue water gas made—*i.e.*, per 1,000 lb. of coke or 883 lb. of carbon:—

Heat leaving the generator during blow	31.4 therms.
Heat remaining in the generator during blow	31.2 therms.
Total ...	62.6 therms.

The production of carburetted water gas at a calorific value of 450 B.Th.U. will extract from the carburettor and superheater 10.4 therms. This quantity of heat also includes radiation losses. There now remain 21 therms in the blow gases, to raise steam. The waste heat boiler will not be over 60% efficient, and 8.4 therms will be lost to the atmosphere through the stack. The remaining 12.6 therms will produce 1,093 lb. of steam from and at 212°F. Additional steam will be raised in the generator boiler, which will amount to 840 lb. from and at 212°F. or a total steam production of 1,933 lb. The steam carbon reactions and undecomposed steam will take 1,708 lb. of steam, while for the pumps and blower plant 790 lb. of steam will be required, giving a total steam consumption of 2,498 lb., and there is a deficiency in steam of 565 lb. This deficiency can be made up, if so desired, by increasing the air/steam ratio. There will then be an increase in the carbon burnt during the run, an increase in the potential and sensible heat in the blow gases, the average temperature of the fuel bed rises, and more sensible heat leaves the generator in the blue water gas. There is also an increase in the percentage steam decomposition and the quality of the blue water gas is improved. The heat which remains in the fuel bed, when producing 85 therms per 1,000 lb. of coke, is distributed as follows:—

	Therms
By the steam carbon reaction	17.25
Sensible heat in blue water gas	4.22
Sensible heat in undecomposed steam	3.15
By the generator boiler	8.59
Evaporation of moisture in coke	0.85
Radiation and convection from seal	1.28
	35.34
Returned from carburettor and superheater as superheated back-run steam	4.14
	31.20

Extra heat to make the plant self-supporting in steam must come from the fuel bed. The carbon monoxide content of the blow gases must be deliberately increased. This is usually achieved by reducing the quantity of steam supplied during the run. Hence, less steam will have to be raised in the plant boilers. It is difficult to arrive at the exact quantity of steam to be supplied so that the heat in the blow gases is just sufficient to heat the chequerwork and to raise all the steam required for the steam carbon reactions. So many factors are involved, and the quantity has to be determined more or less by trial and error. The evolution of the majority of the potential and sensible heat during the blow period is an inherent part of the process, and providing efficient use is made of it no avoidable loss occurs.

The generation of steam in excess of that generated when the plant is working efficiently—that is, when the whole of the potential heat in the blow gases is required to heat the brickwork of the carburettor and superheater, and only part of the sensible heat is used for steam production—can only be achieved by the burning of excess expensive coke in the generator during the blow. If the coke is taken at the market price obtainable, 85s. per ton, then 1 lb. of coke, when completely burnt, produces 13,050 B.Th.U., allowing 10% ash. Even if it is assumed that the boiler is 90% efficient, and 11,745 B.Th.U. pass into steam per lb. of extra coke consumed, to produce one unit of steam (10,000 lb. from and at 212°F.) the additional fuel required to the generator will be 980 lb., at a cost of 37.2s. The cost of the water at 10d./1,000 gal. will be 0.8s., and the total cost of the extra steam is 38s. per unit, excluding capital and maintenance charges for the boiler.

With the modern tendency to use lower and lower grade fuels on boilers, the increased use of waste heat boilers on even small horizontal installations, and the surplus of steam from the modern vertical setting, the steam required in excess of that generated by part of the sensible heat in the waste blow gases can be produced at a much lower figure than this, even when capital, labour, and maintenance charges are included. It may be argued that the cost of the total steam production from the plant waste heat boiler is low, as no charge can be made for the unavoidable waste heat from the plant; but it is clear from the above that to increase deliberately the heat in the waste gases is a costly proposition, and can only be excused if there is a general deficiency of steam on the works.

DISCUSSION

Mr. **A. C. Rea** (Bath) agreed that the manufacture of C.W.G. could be most useful when stocks of No. 3 coke became embarrassing. A comparison between the cost of C.W.G. and coal gas was difficult bearing in mind the wide variation in cost of C.W.G. throughout the area. He would be interested to learn the author's cost figure per therm of C.W.G. produced. It would certainly be bad practice to raise steam from coke at 80s. per ton when breeze at 20s. per ton was available. The figure of 13,050 B.Th.U./lb. was, in his opinion, high.

Mr. **Scantlebury** was unable to provide a figure for C.W.G. cost per therm as no separate figures are available. The figure of 13,050 B.Th.U./lb. had been arrived at by taking 14,600 B.Th.U./lb. of carbon and not coke.

Mr. **J. W. Denton** (Torquay) felt that there was scope for exploration in regard to the use of C.W.G. alone in small stations particularly those with stop end retorts. Economies in this direction could be effected. Labour costs of operating horizontal retorts on three shifts and light loads, were considerably higher than similar charges in respect of C.W.G. operation on day work rates. Where a high C.V. was required the plant would probably be more efficient.

Mr. **K. E. Clarke** asked to what extent the author's figures would be influenced by coke with ash contents of the order 25/30%.

Mr. **Scantlebury** said he had no experience of cokes with high ash content. Of course, the matter could be dealt with by alteration of grate speed and by allowing additional steam on the back run.

Mr. **S. W. Hicken** (Taunton) told the meeting that small coke with inherently high ash content produced from coal with an ash content of the order 25/30% gave rise to a shallow hot zone which in his experience had caused warping of the grate apron plate.

Mr. **L. Baldwin** (Exeter) felt that the steam load factor of a works could be considerably improved by the judicious use of C.W.G. plants during off-peak periods.

Mr. **Ross** (Bristol) remarked that one might expect that the greater contact area with small coke would allow of a very much better steam/carbon reaction and thus allow of a shallower fuel bed being maintained, but in actual practice this was not so.

Mr. **L. W. Clapham** (Bristol) proposed and Mr. **Baldwin** seconded a vote of thanks to the author for his paper.

MECHANICAL AIDS IN A GASWORKS*

By WILLIAM GRAHAM,
Sunderland

In the first part of this paper the author outlined a type of electric motor suspension, and in the second part the development of the lubricated plug valve.

THE motor suspension is of the self adjusting belt tension type originating in the United States and rapidly gaining popularity in this country. On the majority of gasworks there are to be found electric motors driving different types of machinery, either by gearing, flat belts, or V drives. It is to the driven machinery harnessed to a motor by means of either the flat belts or V drives that this type of motor suspension is applicable. The usual and more or less standard practice for the installation of this type of motor drive is for the motor to be mounted upon slide-rails. The belt tension is then adjusted by tension screws which, when rotated, move the motor either to or from the driven machinery according to whether the drive is too tight or too slack.

This type of power transmission has many disadvantages. Rarely do we get power transmitted under ideal conditions—*i.e.*, steady loads, arcs of contact of 180°, tight side below, etc. Therefore, many factors must be taken into consideration if the best results from a belt drive are to be attained. The belts must be heavy enough to transmit the maximum peak load that may develop. Extra belt horsepower is needed when heavy starting loads are encountered as in the case of boosters and heavy fans. Extra belt horsepower is also needed when loads are of an intermittent nature, such as pumps and compressors, or when dealing with shock loads as in disintegrators. Nowadays it is quite common to have short drive centres and high ratio pulleys, using only normal tension through the employment of V rope drives. The wedge action of the ropes tends to counteract the loss of belt grip caused through a reduced arc of contact. With the majority of flat belt drives an arc of contact of 180° is desirable; however, in high ratio pulleys this is not possible unless a jockey pulley is employed. With a reduced arc of contact extra belt tension is required to prevent belt slip of the smaller pulley. This generally results in strained belts and bearings, and a loss of efficiency and frequent breakdowns. Opposed to this we may have the reverse actions taking place. When new belts are fitted there may be an initial stretching, and if this is the case and no tension adjustment is made, then there will be a loss of horsepower transmitted caused by belt slip. A constant and correct tension must be applied to the drive to obtain the desired maximum results.

New Type of Adjustment Needed

It was when faced with the disadvantages of the screw adjusting bedplate that engineers decided that a new type of motor adjustment was needed. Utilising the forces of gravity and motor torque, the swinging bedplate, as I will name it, was brought into being. The swinging bedplate is of simple construction, and can be made quite easily by gasworks engineering staff. Its construction consists of a shaft whose length is about two-thirds the length of the motor, and fitted to each end of the shaft is a bearing. A rectangular frame is made out of angle bar (heel innermost) and welded to the shaft, giving the bedplate the appearance of a see-saw. The size and strength of the angle bars and shaft are dependent upon the size and weight of the motor. Holes are drilled at intervals of about 1 in. along each side member of the frame. These holes have also to correspond with the hole centres of the motor feet. With this arrangement of holes the motor can be advanced along the bedplate and bolted down in any desired position.

* Paper to the Northern Junior Gas Association, October 27, 1950.

If the centre of gravity of the motor is above the axis of the bedplate, then the weight of the motor will be in balance. If, however, the motor is advanced along the frame away from the axis of the bedplate, then the weight on this arm of the bedplate will increase correspondingly with the distance that the motor is advanced from the centre line of the bedplate. If this simple arrangement were placed below the driven machinery the adjustable weight of the motor would hang and be supported by the tension in the belts. The motor should be so placed on the bedplate that the weight it exerts is equal to the initial belt tension. The force of gravity now applies this correct belt tension, which will remain constant irrespective of any undue lengthening or shortening of the belts. On electromotive force being applied to the terminals of the motor, the bedplate immediately swings on its pivot away from the driven machinery. This action, of course, applies extra tension on the belt drive for the initial start of the machinery. As the driven machinery attains speed and momentum so does the bedplate gradually swing back towards its original position. This action gradually reduces belt tension as speed is attained, until finally the correct belt pull is applied to the normal running load. The reason for the swinging movement of the bedplate is that when electric power is applied to the motor the shaft rotation is temporarily held by the belt drive. The reverse motor torque acting opposite to shaft rotation, and having a certain amount of freedom caused through the pivoting bedplate, forces the motor away from the driven machinery on the radius of the bedplate pivot. As the machinery increases speed and momentum, so does it offer less resistance to the shaft horsepower of the motor. To correspond with this, the reverse motor torque also decreases as speed is attained, consequently the bedplate swings, reducing the drive centres and returning the belt tension to the pull needed for normal running.

Motor for Detarrer

At a works with which I am acquainted a 30 B.H.P. flameproof motor with an electromotive force of 440 V and a speed of 730 r.p.m. was harnessed to a mechanical detarrer by means of a V rope drive. The centres of the drive were 2 ft. 6 in., and the arc of contact 155°. This detarrer had a very heavy starting load, but a comparatively light running load, dealing with more or less a constant volume of 6 mill. cu.ft. of gas per day. The above motor was originally mounted on slide-rails with screw adjustment, and owing to space available was placed below the detarrer drive pulley. The tension screws were acting at approximately right angles to the drive requirements. This necessitated a fairly long horizontal screw travel to tighten and apply the tension to the belt drive which was practically vertical. Owing to the heavy starting load, heavy unknown tension was applied to the belts which could only obtain relief if there was a simultaneous stretching of all V ropes. This undue stress resulted in the constant renewal of the white metal bearings on the detarrer, and finally went to the extent of bending the detarrer shaft. A swinging bedplate was installed and the motor adjusted to give the correct belt tension. Immediately it was found that vibration was cut down to the minimum and bearing trouble was practically *nil*. Carrying out a small test on this machine I found that the starting amps were 55, and the running amps 16, taking the motor 35 seconds to reach top speed. This suggests that approximately 32 I.H.P. was needed for the starting load, yet only 9½ I.H.P. was needed when the detarrer had obtained

speed and momentum. For this great starting load the bedplate moved 1½ in. away from the detarrer; therefore, belt tension equalled 1½ in. difference between the starting and running loads of this machine.

To summarise, the advantages of this bedplate are as follows :—

1. Correct tension is applied to the belt drive irrespective of whether the load is fluctuating or constant.
2. The belt tension cannot be altered by unauthorised persons. In the case of the screw adjusting bedplate it is known for an unauthorised person to adjust the belt tension to suit his own requirements, irrespective of what stress is thrown upon the bearings, etc.
3. No adjustment is needed in the case of belt stretching due to weather conditions, etc.
4. In high speed belt transmission centrifugal force applies extra tension to the belts; the swinging bedplate allows for this and belt driving tension remains constant.
5. Tension screws in the screw adjusting bedplate may be of a cheaper production—*i.e.*, Whitworth instead of square threads. These soon become damaged and difficult to turn, and if the atmosphere is damp they may also become rusted. Consequently, when adjustment is required on this type of bedplate it is both difficult and costly, apart from delay.
6. The swinging bedplate can save valuable floor space as its tension angle is more or less vertical when compared with the horizontal tension of the screw adjusting type.
7. It is much quicker to change the belt drive on the swinging bedplate. If the bedplate is tilted the belts can be removed quite easily and without the use of spanners and other tools. Furthermore, when the new belts are in place the tension will be the same as before. This may not be the case in the screw adjusting bedplate, for if there is a difference in length between the new and old belts then there may be a difference in the tension.
8. The swinging bedplate places no undue tension upon the belts; therefore, no undue stress is placed upon the belts and bearings. Less horsepower will be needed to drive the machinery, and both running and maintenance costs will be cheaper.

THE LUBRICATED PLUG VALVE

Valves on a gasworks, though they may appear somewhat insignificant to the layman, are of primary importance. They are placed at strategic points or bridgeheads, and their job is to control the flow of the line fluid.

Nowadays, there is a wide variety of valves from which to select the type most suitable for the particular service to be handled. They include sluice valves, globe valves, gate and piston valves, plug cocks and many others, all of which have certain advantages and disadvantages. However, irrespective of which type of valve may be decided upon, its functions are purely to 'open' and 'close,' to prevent or allow the line fluid to flow. All valves perform this action when new, but I suggest very few remain perfectly tight after a few years of service.

The valve that I propose to talk about is the lubricated plug valve. From the standpoint of resisting erosion, corrosion, and the deposition of line fluid sediment, the plug valve possesses advantages far in excess of the other types of valve. When the plug valve is full 'open' 100% straight through area is assured, which in itself is a most important point. The line fluid has no awkward turns to manipulate as in, say, the globe type of valve, therefore erosion is cut down to the minimum. The smooth through passage-way of the plug valve causes very little or no scaling, and the pressure loss is practically nil. When the globe and mushroom types are in the 'open' position, the seatings are in contact with the line fluid and subject to corrosion. This soon leads to faulty seatings and a leaky valve, and it is well to remember that a valve passing only two drops of liquid per second will equal approximately 1,352 gal. per year. Another advantage of the plug valve is that when 'full open' no machined parts are exposed to the service being handled. When in the closed position only an unimportant portion of the plug is in contact with the action of the line fluid, which does not form part of the machined surface to affect a 'shut off.' This is the second advantage of the plug valve. In other types of valves the seatings are more or less constantly exposed to the action of the line fluid; therefore, erosion and corrosion are ever attacking the machined parts, which rapidly lose their efficiency—to such a degree that they are incapable of performing the primary duty for which they were installed.

The working of the unlubricated plug cock is largely theoretical. In practical use it was found difficult to prevent the entry of the fluid being handled between the machined faces of the plug and body. This was much more apparent if the line fluid were of a corrosive nature, or if there were matter in suspension; therefore, with the course of time and the development of the valve, the plug cock was looked upon by many engineers as just something good enough for low pressure services. No wonder it was relegated as such, for it was subject to seizure and leakage, with many man-hours spent re-grinding plugs and bodies. The plug cock, however, on account of its machined parts not being in contact with the line fluid, was the best type of valve for pressure lubrication. Under these conditions the new pressure lubricated valve was born, but before this valve could be put on to the market many difficulties had to be surmounted in regard to the lubricant. It had to have many qualities; it had to withstand the temperature of the service being handled; it also had to be of such a viscosity to make it effective as a sealing medium. This, of course, would also reduce the frictional effort of turning the plug, and under pressure free the plug if it were ever to seize. With the introduction of this pressure lubricated valve great possibilities were opened. Now plug valves are dealing with test pressures up to 10,000 lb./sq. in. and they range in sizes up to 30 in. diameter.

Main Advantages

The main advantages to be gained from the application of a properly designed lubricated plug valve can be stated briefly under three principles:—

1. The introduction and possibility of maintenance by external means. This is made possible by a protecting film of insoluble lubricant between the taper surfaces of both the body and plug. This film of lubricant prevents wear of the surfaces during rotation. It also prevents the pipeline contents from getting between the surfaces, which could cause scoring and/or corrosion. It reduces considerably the friction and resistance to rotation. This last result is of the utmost importance, since it allows the use of lubricated plug valves in much larger sizes and for higher working pressures than was possible with the ordinary plug cock. It will also be realised that this protective film of lubricant will reduce the rate of attack by corrosion, since the line fluid must first remove or penetrate the film before attacking the seating surfaces.
2. A system of grooves and ducts in the plug and body enable an efficient distribution of the lubricant film, being so arranged as to surround the body and plug ports in such a manner that increase of lubricant pressure in the grooving system will oppose passage of line fluid between the surfaces and so prevent or stop leakage.
3. A lubricant chamber at the small end of the tapered plug in which a high unit pressure can be built up, in order to force the plug endwise out of its seat if necessary, due to the plug being seized from causes such as long neglect or inoperation.

The principle of the plug valve is the plug and body having a system of lubricant ducts and a lubricant chamber in the body at the thin end of the plug. In the stem of the valve is a screw injector which forces a high viscosity lubricant between the metallic faces of the plug and body. This lubricant can be forced between these surfaces at a pressure many times greater than the pressure of the line fluid. To do this, however, very little effort is required on the lubricant screw to force the

lubricant past the check valve and to the outside of the plug, where it fills a circumferential groove. From here the lubricant travels down four long plug ducts or grooves diametrically opposite each other, via the body ducts at the bottom of the taper, and into the base chamber. It can be seen that by this pressure lubricating system the principles of hydraulics are in operation. A small diameter pressure screw acting upon a much larger diameter plug base can cause sufficient pressure to jack the plug from its seat. From practical experience this is no fallacy.

At one works I had the pleasure of seeing a 16 in. lubricated plug valve which was the main stop valve on a 16 in. high pressure unpurified gas main. This valve was in the 'open' position and had never been touched for a period of about five years. One day it had to be closed, and by just inserting one stick of the appropriate lubricant into the valve it was as free, easy, and gas-tight as on the day it was new.

The action of the plug when the lubricant is forced in under pressure is a slight movement of the plug out of its seat. When the lubricant has dissipated, the counter thrust of the resilient packing forces the plug back into its seat. Therefore the entire machined surface of the plug is kept lubricated and fluid tight. It is obvious, of course, that no lubricant should be forced under pressure into the pipeline; hence a simple yet positive action takes place. When the valve is 'opened' the lubricant ducts of the plug which turn into the pipeline automatically isolate themselves from the lubricant pressure supply. This also ensures that there is no leakage, something which could possibly happen if the line fluid were of a very high pressure.

Positive Freeing Action

The latest type of lubricated valve has still further advantages, and much care and thought have gone into the production of this valve. The plug is inverted with the pressure cavity now at the top, which ensures a more positive freeing action as the pressure lubricant first of all fills this cavity before travelling along the plug grooves. If, for some reason, the passage of the lubricant were obstructed in the plug grooves the valve would still free itself and turn. The second feature is that the orthodox method of packing glands are dispensed with. The plug is thus much easier to turn, as gland packing friction and pressure are reduced to practically *nil*. This is important, as packing pressure is applied on its radius from the axis. Thirdly, the seating is by means of a ball bearing acting directly on the axis of the plug; this provides a very sensitive and positive seating means. The adjusting screw acts through a stainless steel diaphragm onto the hardened steel ball, the diaphragm is hermetically sealed and so prevents any escape of the line fluid. The plug and stem are separate, the stem being screwed through the outer cover and attached to the plug by means of a small clutch. This clutch allows the stem and plug to rotate together, but these two parts are independent as to lateral movement. Thus line pressure thrust on the plug is not transmitted to the stem, which facilitates an easy rotary movement even on high differential pressures. With the stem being screwed through the outer cover the serrated edges form a large additional surface area which offers greater resistance to any leakage. If, however, there were any slow leakages of lubricant past this screw thread it would be efficiently dealt with. Near the outer end of the stem is a secondary seal and into this is forced a semi-plastic compound by means of a side feed injector.

The design of the plug valve is simplicity and strength. It has only one moving part and this requires only quarter of a turn to 'open' or 'close.' Quickness of operation is assured together with a fluid-tight valve. This is most important if only in the case of fire control. There are no threaded spindles as in the gate type valve, for these do lose their efficiency and strength, and can be very misleading. I do know of one case where a external screw type gate valve was fitted into a very important 14 in. unpurified gas main. This valve was in the 'open' position. After a period of time a corrosive action ate through the internal part of the valve spindle, the spade then dropped into the 'closed' position, yet the handwheel still indicated the valve as being 'open.' In another case the wedge type spade of a 16 in. Fullway valve not being a perfect fit seized in the body of the valve. On trying to open the valve the screw pressure of the spindle broke the lugs off the spade. This entailed the use of skilled labour on a very difficult and awkward job. Special drawing gear had to be made to withdraw the then damaged spade; at the same time a 'shut down' of that particular main was necessary until repairs were carried out. With the lubricated valve the body and plug have to be made of the best materials. One reason for this is that the valve body has to be strong enough to withstand the internal pressure of the lubricant. This alone would account for the very robust nature of the lubricated valve. This valve body strength has another feature, for it has strength to overcome any pipeline stresses and strains.

DISCUSSION

Mr. **J. McManus** (Howdon-on-Tyne) asked whether the swinging bedplate could be used only when the driving motor was below the centre of the driven pulley. If the answer was in the affirmative, could the author give the minimum angle at which the arrangement could be operated. In cases of belt breakages, was some arangement of safety stop necessary to prevent the motor and swinging bedplate from rotating on the axle of the latter with possible consequential damage? He enquired also whether Mr. Graham had any hints to offer on the obtaining of correct belt tensions.

Mr. **Graham,** in reply, said that the drive could be at any angle. In certain cases the motor was suspended in a cage with the pivot above giving it a pendulum effect. Safety stops were and should be provided in case of belt breakage, and it was an error on his part not to have mentioned this fact. Many things were taken into account for the correct belt tension. A formula detail could be had from any catalogue issued by transmission belting companies. For a simple drive :—

$$\text{H.P.} = \frac{(T1 - T2)V}{33{,}000}$$

T1 was approx. 2¼ times T2.

Mr. **McManus :** In view of the rather complicated arrangement necessary to place the motor above the driven pulley, would it not be simpler and just as efficient to use a fluid coupling?

Mr. **Graham :** I disagree that the cage mounted motor is complicated, for its operation is simplicity. For efficiency I know of one similarly mounted, and apart from routine oiling it has never been touched for at least 15 years. A fluid flywheel is hardly comparable owing to the fact that it limits the machinery speed to that of the motor.

Mr. **Waiton** (Howdon-on-Tyne) asked whether the author had any experience of the swinging bedplate on drives where a long belt was used. He could well imagine that the flapping of a long belt might cause vibration at the drive end. If vibration were started it was possible that the belt flap would further aggravate the movement until the motor was actually rocking.

Mr. **Graham** said he had not seen a swinging bedplate employed where a long drive was in use. In such a case he would suggest either moving the motor nearer to the driven machinery, or shortening the primary drive through the employment of a countershaft.

Mr. **Ashman** (Middlesbrough) queried whether a motor with a heavy starting torque would not be vicious with this type of drive.

Mr. **Graham** replied that the swinging action of the bedplate did to some extent depend on the type of motor employed, for there was a marked difference between a slip-ring motor and a squirrel cage motor. One went into action much quicker than the other, though he did not think the viciousness on the drive was any worse than other drives. Besides the belts would be strong enough to withstand the heaviest expected load.

Mr. **Bovill** (Stanley) disagreed with Mr. Ashman that a heavy motor would be vicious with the belt drive.

Mr. **Graham,** in conclusion, remarked that, irrespective of the motor weight, the effective belt tension could be adjusted about the axle of the bedplate. Further, for a heavy motor with a heavy torque the belt drive had to be correspondingly heavy to transmit the shaft horsepower. Therefore, the drive was quite capable of dealing with this so-called viciousness.

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says Mr. MERCURY

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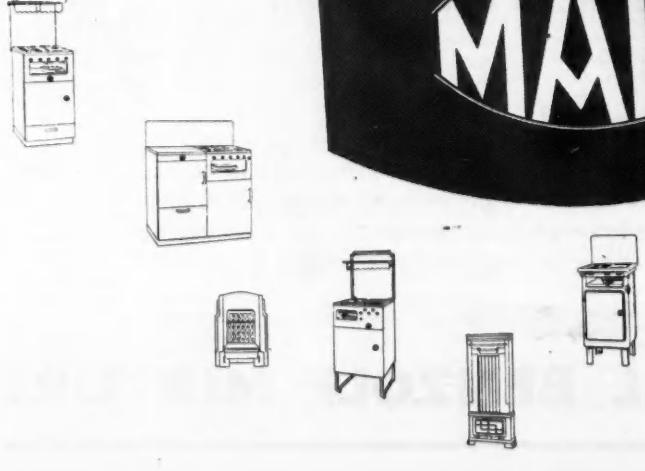

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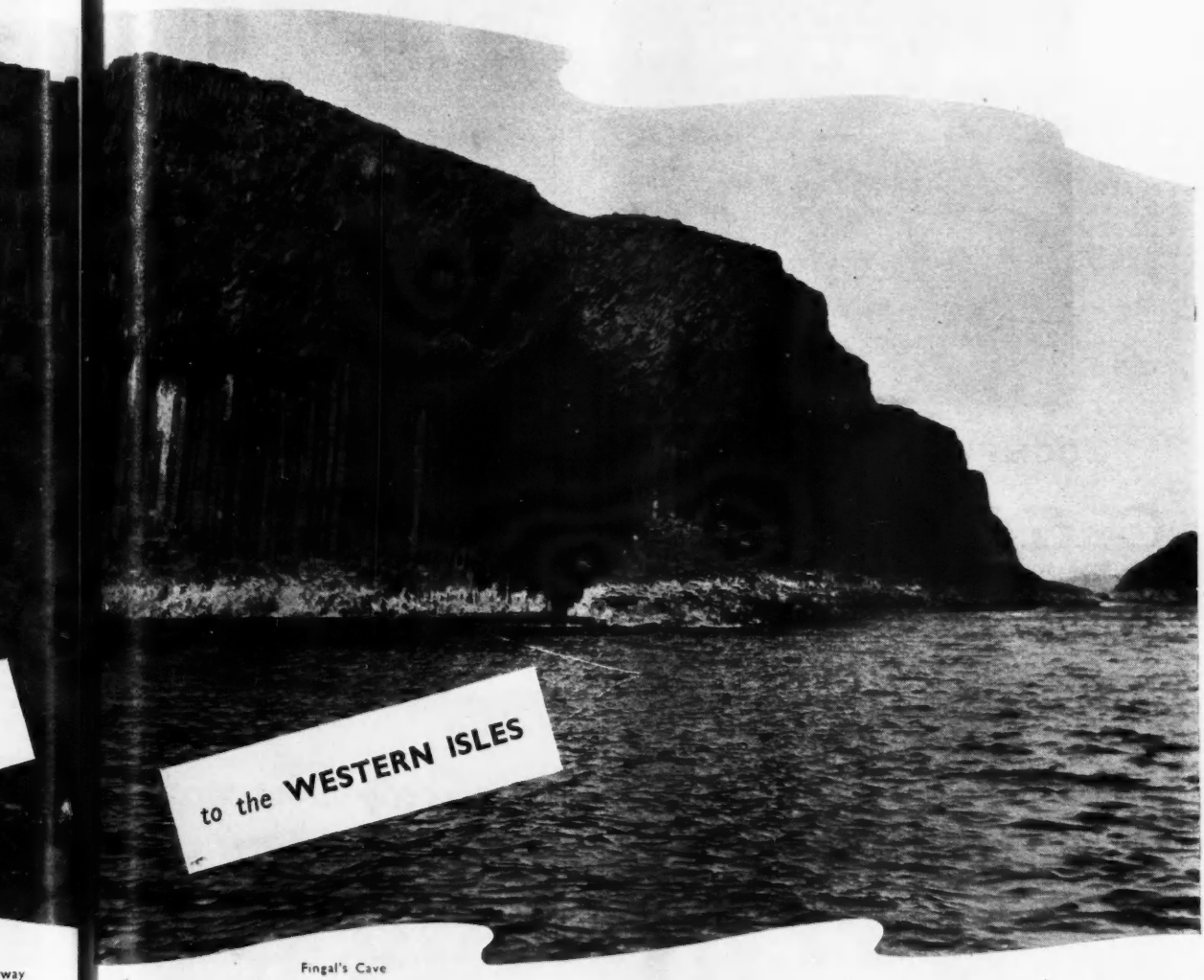

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THE SUPPLY OF GAS COKE* . . .

A Distributor's Problems

By JOHN CHARRINGTON, Jnr.

A DISTRIBUTOR'S problems inevitably start in the field of supply, for he is dependent upon sources of production and in most cases loading not under his own control. The system of programming works well, and a distributor can usually arrange for his coke to be supplied by the desired producer. As, however, distributors do not control the production or loading of coke at gasworks they are never able, with certainty, to plan the following day's work for their vehicles which load from works.

In practice gasworks loading is most efficient, but from time to time breakdowns occur, and then the distributor has, if possible, to switch his lorries at a moment's notice to other works. In country areas this cannot be done and the distributor will go without. The fact that distributors are content to carry only small stocks on their own yards and leave the main task of stocking in the hands of the producers is a testimony to the faith which we have in the good services provided for us by the gas industry.

In times of shortage the gas industry has found it necessary to ration supplies of coke. This is always the cause of great difficulty to the distributor, as it is often late in the afternoon before he knows what tonnage of the various sizes of coke he can expect for delivery the next day. At the same time his customers are anxious to know when they can expect delivery. In spite of these annoyances, size rationing in times of shortage is most undesirable if problems are not to become still greater. It is not unknown for the queue outside a gasworks to start forming up at 3 a.m., as soon as coke appears to become short.

The greatest problem, however, for a distributor, and especially in London, is obtaining supplies of the right type of coke for customers' requirements. With three different types of gas coke—horizontal, intermittent vertical, and continuous vertical—to choose from, distributors in the main endeavour to supply to their customers that coke which seems best suited to their needs.

Coke users accustomed to consistent quality do not take kindly to a sudden change in the type of coke delivered and great trouble can be caused by supplying a consumer used to continuous vertical coke with a delivery of intermittent vertical coke. This particularly applies to the domestic market. In the peak winter period when circumstances impose a temporary shortage of all types and grades, the job of supplying consumers with the right coke is a distributor's major problem.

Over the past years certain distributors have built up a good coke trade on coke from particular works and it is to be hoped that with the advent of nationalisation distributors will, so far as the availability of supplies permits, be able to draw coke from 'traditional works,' rather than be channelled into certain alternative works because of some over-riding overall local coke plan.

In recent years it has not been uncommon for supplies of large coke during the peak winter period to be insufficient for the demands and many distributors have had to supply large coke customers with broken coke. While this was perhaps acceptable in the war years, it now causes great annoyance to those who sign contracts for the supply of a certain size of coke at a definite price and then have to accept an unwanted size at an increased price. The problem of keeping these consumers contented users of coke is often most difficult.

At some gasworks difficulty is caused to distributors by the long time their men have to wait to be loaded. The chief trouble is the attitude of the delivery men, who not unnaturally dislike having to wait for long periods of time quite idle and earning no money. Valuable loads are sometimes lost this way. One way round this problem might be to offer a lower price to merchants who take coke by rail at their own sidings. As it is at present, no merchant likes paying to load his own coke when it is loaded for him, free of charge, at gasworks. Certainly at peak periods some solution on the lines suggested might be helpful.

Quality and Price

I consider the problems of quality and price go together more than ever before. With today's price levels at the zenith, it is most important that the consumer gets:

1. The cleanest and best graded fuel possible.
2. The highest possible calorific value.

People are beginning to get fuel conscious who never considered this aspect before. Not only are they much more particular, but they are beginning to look for something better if possible, though the word 'better' does *not* necessarily mean cheaper in all cases. Except in industry, where cost of heat usually means everything and an accurate check can be kept, there is a tendency to stress convenience to a remarkable degree, particularly in such applications as central heating for buildings.

This has largely been brought about by the difficulty of obtaining and retaining labour, and by the problem of dirt from ashes and its subsequent handling, together with consideration of space; people are now prepared to pay for convenience more than ever before; in fact, they *must* have it today. Unfortunately, the market most vulnerable—*i.e.*, central heating and small industrial—is the backbone of the gas coke industry, at any rate in London. It is this market that is threatened most of all by competitive fuels in the following order of importance:

1. Stoker fired coal.
2. Oil.
3. Gas.
4. Electricity.

As it is, much ungraded and poor coke finds its way on to the market, containing far too much small breeze, and this fact tends to annoy consumers even more than possible low calorific value, because the breeze hits the eye at once and stamps the idea of bad fuel on the buyer's mind. The effect is psychological and persistent. Central heating systems are the oil salesman's dream, by reasons of convenience allied to the fact that it is practically impossible to arrive at overall *heating costs* for any building. A yearly fuel bill also means little; so much depends on weather, period of operation, time occupied by labour, and other imponderable factors.

I do not, however, suggest that oil would not sometimes be roughly equivalent in total overall cost to coke. Under certain circumstances it might even improve on the cost. What I wish to make quite clear is that once conversion is made, it will be a major operation to bring about reversion.

We have been left a legacy in the shape of thousands of sectional boilers the vast majority of which in pre-war days

* Paper to the London and Counties Coke Sales Circle in London, November 15, 1950.

burned large or broken coke. They gave every satisfaction because labour was much easier and competition only in its infancy; therefore, there was far less incentive to change. Coke was of good quality, was cheap "on paper"—at any rate its price did not force itself on the notice of the purchaser as it does today. These hand-fired boilers operated inefficiently not because they were intrinsically inefficient, but because in nearly every case occasional attention, about once every four hours, was good enough and no one greatly cared about the annual fuel bill as it was much the same yearly. Niceties of costing heat were almost unheard of.

A few consumers, however, began to install underfeed coal stokers, thereby finding their annual fuel bill was less, mainly due to increased efficiency combined with lower fuel price. They also found an advantage in the fact that machines could be automatically started by a clock setting at a suitable time in the morning and that the water temperature could be automatically governed; in fact, they began to experience convenience. Still there was little effort to sort out overall heat costs, though they were obviously less than before.

Oil installations started to become fairly common in London in the middle 'twenties, particularly where space consideration made the use of coke difficult; this, of course, is an aspect of convenience. These plants were of great publicity value in that architects and others found a means of saving space. The incidental advantages became known under the able exploitation of the oil companies' salesmen.

Underfeed coal stokers began to appear in the 'twenties; in fact, they were specially designed for the sectional boiler market, which represents about 80% of their sales today. Here again convenience in the form of automatic operation was the main theme, though cheap fuel and lower heat costs were great points too.

In the course of time it became well known to architects and consultants that generally speaking better and cheaper heating could be obtained by fitting stokers and that labour was reduced. Gas and electricity, which are "de luxe" fuels, are intrinsically expensive and have only limited applications. Nevertheless, one of the biggest blocks of buildings in London is heated by electric thermal storage boilers—*i.e.*, super immersion heaters, which heat up during off-peak periods at night at a special rate for current. It was argued that the absence of any flues whatsoever, would compensate for extra fuel costs, via reduced capital expenditure and almost total absence of labour. This really comes down to convenience selling the idea of a much more expensive fuel.

Qualified Technical Staff

The distributor of today is faced more than ever with the problem of selling coke in competition with stoker fired coal or oil, for with the shortage of manpower, the convenience factor is made more attractive than ever before. If, therefore, he is to hold his own in this very competitive market, and not only maintain but help expand existing markets for coke, then it seems essential that he should back his delivery organisation with a fully qualified technical staff. It should also be obvious that the coke which he sells should be of good quality.

In the domestic market, coke's competitors are, anthracite —in short supply—electricity and gas. As far as price is concerned coke is competitive with anthracite and is cheaper than gas or electricity. The quality of small gas coke does, however, leave much to be desired. The shale content is excessively high due to unwashed coal being provided for gas making, and distributors are constantly worried by complaints of the boiler being put out by impurities. This can be overcome by carefully instructing the customer in the use of coke in a small domestic boiler and by carefully supplying the same type of coke at all times. With the best will in the world, however, distributors find this very difficult at times, and with the present shortage of coke, distributors must take what they are offered and consistency of quality goes to the wind.

The convenience factor in the home is as important as it is in a block of flats, or offices, and if the boiler requires constant attention the customer will turn to another type of water heating, regardless of expense. It is to be hoped that clean coal can soon be supplied to the gas industry, and in sufficient quantity to enable adequate reserves always to be held, thus ensuring that consumers do get consistency of quality.

The economics of coke burning are very closely linked with what has already been stated on price and quality. It is not particularly easy to view this question clearly owing to the variables, particularly in the case of oil. It is suggested that the *average* efficiency of hand fired sectional boilers is about 50% on coke or coal and that when stokers are fitted to burn a suitable nut coal, the average is 60%.

Oil-fired plants should perhaps average 67%, though burner makers will probably deny the assumption. Test figures as quoted by combustion equipment makers are much higher and are perfectly correct and reasonable, but they refer to special tests run by experts over limited periods under ideal conditions. Winter and summer running, including shut downs, banking, etc., supervised by unskilled labour is a very different matter.

While there is little experience with gravity coke stokers, experience with gravity boilers suggests that average efficiencies of 70% should be maintained, because of inherent high efficiency due to design and the fact that once adjusted and given a correct fuel there is little that the most inexperienced attendant can do to upset conditions. There is no gear change, as in stokers, and no manual valve adjustment for oil flow, to call for any exertion of intelligence.

Delivery Problems

Delivery problems arise mainly from the awkward siting of the coke store. It would seem that in the past architects gave little consideration to fuel storage, possibly on account of the excellent service provided by coke producers and distributors. There are hundreds of buildings in London where the coke store is down a long narrow passage, or down several flights of winding stairs. Such places are most unpopular with delivery men and, in winter months, with clerical staff who have to plan the work, because the delivery of a 5-ton load can take twice as long as a straightforward delivery, and thus keep lorries from attaining their full output per diem.

The low bulk density of coke means that the tonnage that can be stored in buildings during summer months is often inadequate and this to a distributor is a serious matter. Hired transport is not now so easily obtainable, as was the case before the war, and the distributor finds himself faced with the problem of having either to maintain a fleet large enough to meet his winter demands, but too large for summer needs, or conversely one that is economical for the summer, but which can only carry the winter load by working at an excessive rate. In an endeavour to help overcome this problem in my own company we experimented with a long wheelbase tipping lorry with removable sides. The idea was that in summer the vehicle would be used as a platform lorry for carrying sacked coke for delivery to stock, and in the winter by the addition of the sides the lorry could be converted to a bulk tipper, thus materially increasing its output. In practice, however, the lorry has not achieved its object owing to the delivery wage rate for bulk coke being the same as that for sack coke. The driver therefore after four loads has earned as much money as he wants and the increase in the vehicle's output is not as great as had been planned. A long wheelbase tipper is, however, an ideal lorry for carrying coke, and the vehicle in question is now permanently employed for bulk tipping coke.

Another reason for the comparative failure of this bulk/sack lorry has been the disinclination of consumers to accept delivery in bulk without receiving any price advantage. If there was a differential between the price for coke delivered by sack and that delivered in bulk, it would certainly influence

some consumers to take delivery in bulk. It would also mean a differential between the wage rates for coke delivered in sack and bulk; and thus there would be more incentive to men to deliver perhaps twice the number of loads than is the case today.

Looking ahead, however, it is to be hoped that the architects of our future flats, shops, and blocks of offices will aim to provide sufficient space for the storage of six weeks' winter consumption of coke and that this space will be readily accessible to suppliers' lorries. A good hard surface should be provided and an adequate entrance through which a lorry can be easily backed, or alternatively plenty of turning space. There is at least one block of flats in London where a brick pillar erected by the architect, for aesthetic rather than practical reasons, has now had to be removed because of the constant damage done to it by coke lorries.

Yellow band streets in London have created a problem to distributors, who in many cases cannot deliver the full amount required by the customer during the restricted hours. With a view to overcoming this difficulty, and to enable certain difficult deliveries to be made more easily, my Company has recently developed and patented a special type of hopper shaped lorry body, with detachable conveyor. This enables coke to be delivered at a higher rate than is possible with sacks, either through pavement chutes, or over low walls, or through windows. Coke can also be stacked to about 8 ft. by the conveyor. Similar vehicles have been in use for some time in the United States and work satisfactorily.

DISCUSSION

In the course of the discussion which followed Mr. Charrington's paper, it was suggested that a useful way of overcoming congestion of coke at the gasworks during the summer was to introduce a price differential to encourage customers to buy supplies at a cheaper rate and fill up their own storage accommodation. It was considered, however, that in many of the smaller post-war houses storage space was insufficient—certainly not six weeks' supply. In some areas the merchants had to carry their own stocks instead of supplying direct from the gasworks; but in any event a price differential would encourage them to fill up their own yards at the cheaper rate in the summer—the higher rate in the winter compensating them for the double handling. Space was so valuable in business and industrial areas that firms were reluctant to occupy it with fuel unless it paid them to do so. The capital cost of storage accommodation was considerable, and if the builder could save money by cutting it he would do so.

It was considered that the time had come to give customers some financial inducement to take their coke supplies in bulk. But at the same time some equivalent adjustment should be made in the wage rates of the delivery men. The reason, it was suggested, why the delivery men were reluctant to deliver more bulk loads was because they got into a higher income tax bracket—and it was not worth their while to earn more.

In considering any question of price differentials, it was emphasised that the advantage must be substantial to tempt domestic consumers to spend money on fuel during the summer when they were saving up every penny towards their holidays.

SCOTTISH DISTRICT TAR BOARD

THE annual meeting of the Scottish District Tar Board was held at the North British Hotel, Edinburgh, on December 1. On this occasion the proceedings were followed by a luncheon meeting with surveyors. Both meetings were presided over by Mr. W. McFarlane, Scottish Tar Distillers, Ltd.

Among those present were Dr. W. H. Glanville, C.B.E., Director of Road Research; Dr. R. S. Millard, Officer in Charge, Scottish Branch, Road Research Laboratory; Mr. J. A. Burnett, Divisional Road Engineer, and Mr. Crichton-Brown, Senior Engineer, Ministry of Transport, Scotland; Mr. G. S. Barry, County Road Surveyor, Ayrshire; Mr. T. A. Gourley, County Road Surveyor, Berwickshire; Mr. J. O. Spittal, Assistant County Surveyor, Lanarkshire; Sir Andrew Clow, K.C.S.I., Chairman, and Mr. D. D. Burns, Deputy Chairman, Scottish Gas Board; Mr. J. Davidson Pratt, C.B.E., Chairman, and Mr. W. E. Cone, Technical Adviser, British Road Tar Association; Mr. F. M. Potter, Scottish Tar Distillers, Ltd., and a number of other guests.

Mr. Davidson Pratt gave a brief account of the research and technical activities of the B.R.T.A., and referred to the progress made in the maintenance of roads by surface dressing with tar. He also dealt with the experiments carried out by the Road Research Laboratory with cetyl pyridinium bromide (C.P.B.) applied to the stone chippings in surface dressing work carried out in wet weather. Mr. Davidson Pratt concluded his remarks with a brief review of the tar carpet position, and said that the Association would be glad to have the co-operation of surveyors in the laying of demonstration lengths.

Dr. Millard gave an interesting account of the work that is being undertaken in the laboratory of the Scottish Branch of the Road Research Laboratory. Mr. Barry, County Road Surveyor, Ayrshire, Mr. Gourley, County Surveyor, Berwickshire, and Mr. J. O. Spittal, Assistant County Surveyor, Lanarkshire, also spoke at the meeting. Sir Andrew Clow moved a vote of thanks to Mr. McFarlane for presiding over the meeting, and the latter suitably responded.

N.C.B. Quarterly Statement

The Board's results for the third quarter of 1950 were materially affected by holidays and can most usefully be compared with the results for the third quarter of 1949. Apart from holidays, the main factor influencing the results was the reduction in manpower. The average manpower on the books during the third quarter of 1950 (694,000) was 24,000 less than the average for the third quarter of 1949 (718,000).

Compared with the third quarter of 1949, costs increased by 4.4d. per ton. Wages costs per ton were unchanged, and the main increases resulted from increased prices of materials used and the increased provision for depreciation (1.6d. per ton). Proceeds were 10.1d. per ton lower than in the third quarter of 1949. This reduction was due to the house coal summer prices scheme and to the reduced tonnage of exports for which the prices obtained are higher than for inland sales.

As a result of these changes the colliery profit (before charging interest) was 1s. 5.7d. per ton, compared with 2s. 8.2d. per ton in the third quarter of 1949. After bringing into account ancillary profits and providing for interest and taxation, there was an estimated deficit for the quarter of approximately £460,000, which compared with an estimated surplus of £2,350,000 for the third quarter of 1949.

In 1947, the first year of nationalisation of the mines, the industry's deficit, after payment of interest and interim income was £23,255,586; in 1948 the industry made a profit of £1,651,965; and in 1949 a profit of £9,466,813. The estimated surplus for the first quarter of 1950 was £5,600,011 and for the second quarter £2,451,971.

Low Coal Stocks.—At a meeting of the Belfast Gas Committee it was reported that coal stocks were 10,000 tons below those of this time last year. Some reserve stock had to be used to meet normal demand. It was decided to notify the Ministry of Commerce of the situation. The Committee is to consider the building of a new gasholder at Glengormley, five miles distant and outside the city boundary to supply Glengormley, Whiteabbey and Jordanstown, where demand is difficult to meet at peak hours.

Paid by Two State Boards.—A White Paper published on December 14 gave the names of members of the Iron and Steel Corporation who are also paid members of boards of other nationalised industries. Sir John Green, Deputy Chairman, who receives £5,000 from the Corporation, is a part-time member of the East Midlands Gas Board, for which he receives £500 a year. Mr. A. R. McBain, a part-time member of the Iron and Steel Corporation, is also a part-time member of the Southern Gas Board, and receives £500 a year in respect of each appointment.

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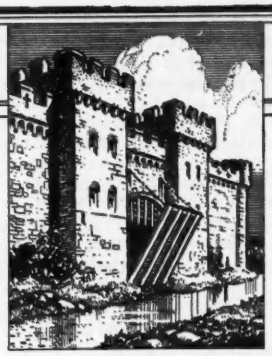

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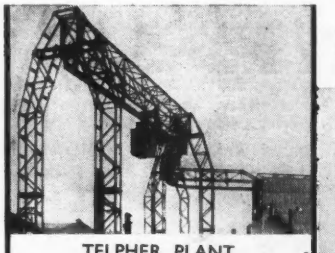

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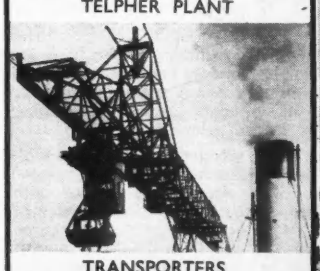

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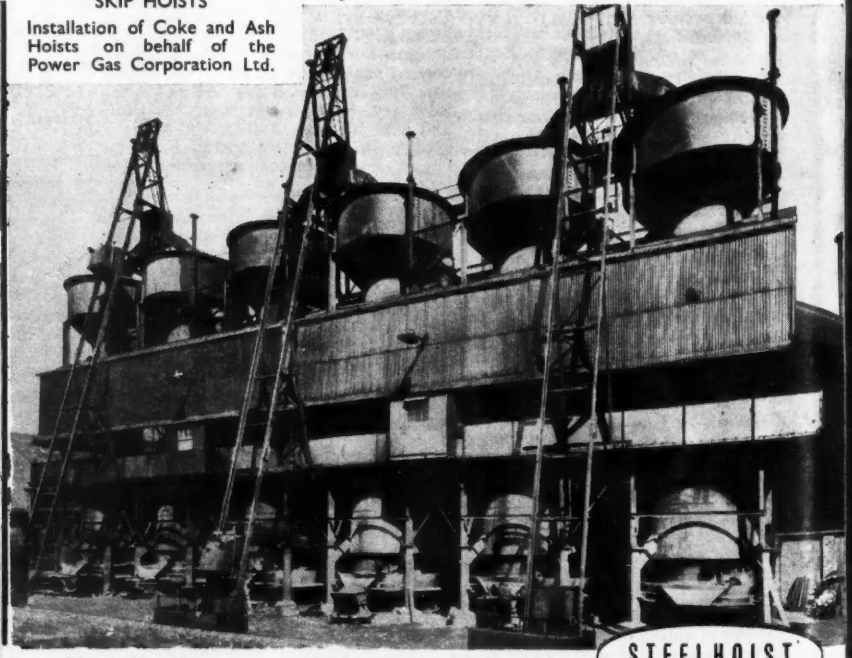

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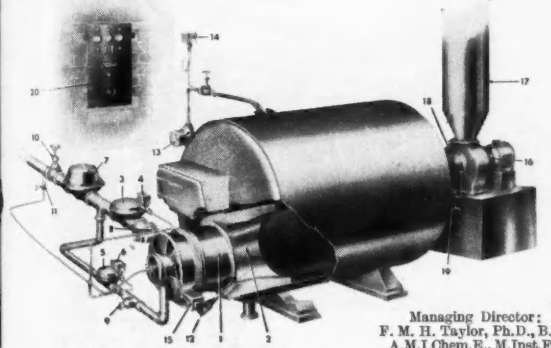

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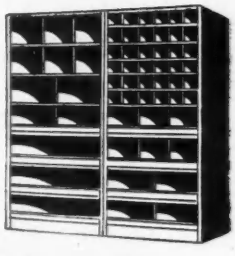

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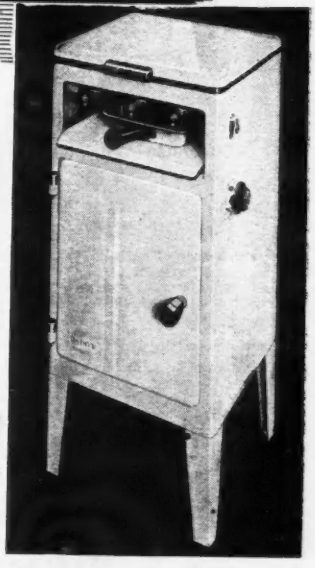

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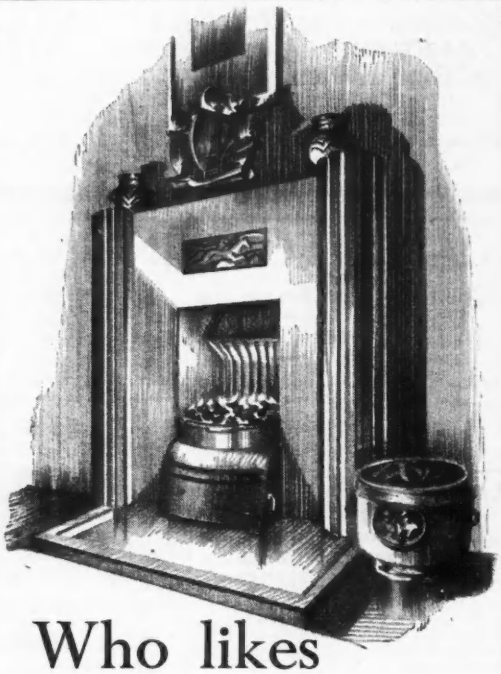

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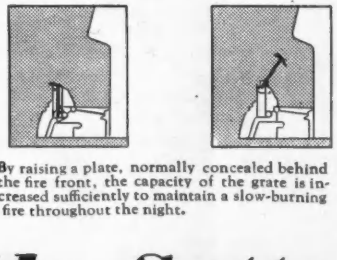

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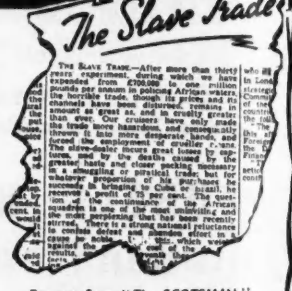

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NORTHERN MANAGER: W. Q. Foster, 33, St. Helens Road, Harrogate. 'Phone: Harrogate 84291.

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APPOINTMENTS VACANT

DRAUGHTSMAN with sound knowledge of gasworks and allied chemical plant design required. Age 35 or upwards. Pension scheme. Permanent position to suitable applicant.

Fullest details of experience, age and salary, to R. & J. DEMPSTER, LTD., Gas Plant Works, Manchester 10.

DRAUGHTSMAN required with sound knowledge of gasworks and coke ovens by-product work and allied chemical plant design. Age 30-35. Permanent position to suitable applicant who must be of section leader or equal status. Must be capable of working on own initiative. Commencing salary £550-£600 per annum according to ability. Apply by letter to GEORGE ROYSTON & SON, LTD., Chemical Engineers and Leadburners, Winter Grove Works, Barnsley, Yorks.

NORTH WESTERN GAS BOARD

MANCHESTER GROUP.
APPOINTMENT OF
INDUSTRIAL SALES ENGINEERS.

APPLICATIONS are invited for the above appointments within the salary range Provincial 'A,' A.P.T. VII, £450-£530 per annum. The successful applicants may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applicants should have had considerable experience in the installation and operation of industrial gas appliances and should possess the Higher Grade Certificate of the Institution of Gas Engineers (Supply) or equivalent qualification.

Letters of application, giving details of experience and stating age and qualifications, should be addressed to the undersigned in envelopes endorsed 'Industrial Sales Engineer' to be received not later than Monday, December 25, 1950.

JOHN WILSON,
General Manager.

Town Hall,
Manchester, 2.

NORTH WESTERN GAS BOARD

FYLDE GROUP.
BLACKPOOL DISTRICT.
INSTALLATIONS OFFICER.

APPLICATIONS are invited for the position of INSTALLATIONS OFFICER for the Blackpool District. Candidates should have the Higher Grade Certificate in Gas Engineering (Supply) and a First Class Final City and Guilds Certificate in Gas Fitting or Plumbing.

The successful applicant will be responsible under the Group Sales and Service Officer for the organisation and control of fittings and maintenance staffs and workshop personnel engaged upon the installation of gas meters and appliances.

The salary will be in accordance with A.P.T. X (£570-£670) of the National Salary Scales, the commencing rate on this scale to be commensurate with experience.

The successful applicant may be required to pass a medical examination and to subscribe to such scheme of superannuation as the Board may adopt.

Applications, stating age, training and present position, qualifications and experience, together with two Testimonials, should be forwarded to the undersigned, to arrive not later than 14 days following the date of this publication.

J. G. O. DRAKE,
General Manager.

Princess Street,
Blackpool.

LEADING manufacturers of gas meters require experienced REPRESENTATIVE for East Midlands, Yorkshire and the North. State details of past experience, age, education and other relevant matter. Successful applicant will be required to contribute to the Company's pension scheme.

No. 9940, *Gas Journal*, 11, Bolt Court. Fleet Street, London, E.C.4.

GAS AND FUEL CORPORATION OF VICTORIA, AUSTRALIA

APPLICATIONS, returnable to the Secretary, Premier's Department, Melbourne, C.2, by March 31, 1951, are invited for appointment to the office of Chairman of Directors of the Gas and Fuel Corporation of Victoria, under the Gas and Fuel Corporation Act, 1950.

The Corporation is empowered to carry on the businesses of production, sale and supply of town gas, the gasification of brown coal by the Lurgi high pressure gasification process, the recovery, manufacture and sale of coke, tar, pitch, ammonia, dyes and other residual and synthetic products also by-products and residuals arising in the manufacture of town gas.

The salary is £5,000 per annum.

Full details of the functions and scope of the Corporation are contained in the Victorian Gas and Fuel Corporation Act, 1950.

EAST MIDLANDS GAS BOARD

NORTHANTS SUB-DIVISION.
KETTERING UNDERTAKING.
GRADE I AND II GAS FITTERS.

GAS FITTERS are required for duties within the Kettering, Corby and Burton Latimer areas of supply. Pay and conditions in accordance with N.J.I.C. Grade A rates.

In the case of one vacancy, house accommodation is available at Corby.

Applications, with *copies* of references, to P. T. Harris, Group Manager, East Midlands Gas Board, 40, High Street, Kettering, by first post on Monday, January 1, 1951.

December 13, 1950.

EAST MIDLANDS GAS BOARD

NOTTS AND DERBY DIVISION.
DERBY UNDERTAKING.
INDUSTRIAL GAS ENGINEER.

APPLICATIONS are invited from suitably qualified persons holding Higher Grade Certificate in Gas Engineering (Supply) for the appointment of INDUSTRIAL GAS ENGINEER in the Derby Undertaking.

The salary offered for the post is in accordance with A.P.T. Grade XII of the National Scales for Salaries (£645-£770).

Candidates must have a sound knowledge of combustion and utilisation of industrial and commercial gas, particularly as applied to heavy industry.

The successful applicant will be required to pass a medical examination and the appointment will be subject to such superannuation scheme which may be adopted by the Board.

Applications, stating age, qualifications and experience, together with details of present and previous appointments and giving the names of two referees, should be addressed to the undersigned to reach him not later than December 29, 1950.

K. L. PEARCE,
Divisional General Manager.

7, Friar Gate,
Derby.

December 7, 1950.

(Classified advertisements continued on Supplement 4)

APPOINTMENTS VACANT (ctd.)

RESEARCH OFFICER with science degree, preferably engineering, required for work in connection with the combustion of coal applied to steam raising. Previous experience desirable, but not essential. Commencing salary £350-£550 according to qualifications, &c. Superannuation scheme. Five-day week.

Apply in writing to the Assistant Secretary, B.C.U.R.A., Randalls Road, Leatherhead, Surrey.

FIRST-CLASS DESIGN ENGINEER (over 30) wanted to take charge (under Chief Engineer) of schemes and estimating department for well known firm of gas engineering contractors. Coal and coke handling experience of primary importance.

Write in confidence, stating age, training and experience in chronological order, and salary required, &c., to No. 9941, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

SCOTTISH GAS BOARD

KILMARNOCK GROUP.

MUIRKIRK DISTRICT.

APPOINTMENT OF DISTRICT MANAGER.

APPLICATIONS are invited for the position of DISTRICT MANAGER of the Muirkirk District Gas Undertaking.

Applicants must be experienced in the administration and supervision of a gas undertaking and have had sound practical experience in the control of horizontal retor settings, distribution practice, and general office routine.

The salary applicable to the post will be within Grade VI, Provincial B, of the National Salary Scale (£400 to £480 per annum), placing on salary scale according to qualifications and experience. A suitable house will be provided free, with coal and gas.

Applicants should state whether or not the position they presently hold is superannuated, and the successful candidate may require to pass a medical examination.

Applications, giving full particulars of age, qualifications and experience, together wtih *copies* of three references, to be received by the undersigned not later than Saturday, December 30, 1950.

ROBERT FIFE,
Group Manager.

Riverbank Gasworks,
Kilmarnock.
December 8, 1950.

SCOTTISH GAS BOARD

LANARKSHIRE GROUP.

LANARK COUNTY DISTRICT.

APPOINTMENT OF WORKS ASSISTANT SUPERINTENDENT AND PLANT ENGINEER.

APPLICATIONS are invited for the above appointment in the Lanark County District.

Applicants must be thoroughly trained, suitably qualified and have had sound practical experience in mechanical and electrical engineering. A knowledge of structural engineering would be an advantage. Applicants should have held a responsible position in mechanical engineering and be accustomed to the supervision of works plant and maintenance staffs. Applicants with gasworks experience preferred, but not essential.

Salary on Grade A.P.T. IV, £480 to £525 per annum with placing according to qualifications and experience. The successful applicant will be required to pass a medical examination and the appointment will be subject to the provisions of such superannuation scheme as may be adopted by the Board.

Applications, giving full particulars of age, qualifications and experience, to be accompanied by three recent Testimonials, to be lodged with the undersigned not later than January 14, 1951.

FRED R. MITCHELL,
Group Manager.

Gas Offices,
Uddingston.

ASSISTANT INSPECTOR, 30-40 years of age, with draughting experience, required by an old-established engineering firm in the West Riding of Yorkshire. Inspection chiefly of cast iron and fabricated vessels. Applicants must have served an apprenticeship and had many years of practical floor experience, preferably with a firm manufacturing gas and chemical plant or with a gas undertaking. Superannuation scheme.

State age, experience and salary required to No. 9943, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WEST MIDLANDS GAS BOARD

KIDDERMINSTER DISTRICT.

WANTED. A competent MAIN AND SERVICE LAYER with sound practical experience, and a FIRST CLASS GAS FITTER, experienced in the fixing and maintenance of all types of modern gas appliances.

Wages according to the National Joint Industrial Council for the Gas Industry. Provincial 'B' Rates.

Applications, stating age, experience and *copies* of references, to the Manager, West Midlands Gas Board, Kidderminster District, Pitts Lane, Kidderminster.

JONES GAS PROCESS COMPANY, LTD.

APPOINTMENT OF RESEARCH CHEMIST.

APPLICATIONS are invited for the post of RESEARCH CHEMIST to the above company for duties connected with research and development of a process or processes for the production of oil-gas and carbon black.

Applicants should preferably hold a university degree and be qualified in chemistry and physics. A practical knowledge of chemical and gas engineering is desirable.

The salary for the appointment will be between £750 and £850 per annum according to qualifications and experience.

Written applications, stating age, qualifications and experience, should be addressed to the undersigned not later than January 16, 1951.

L. T. CRAMPTON,
Manager and Secretary.

The Gasworks,
Gloucester Road,
Cheltenham,
Glos.

EASTERN GAS BOARD

NORWICH DIVISION.

HOME SERVICE ADVISER.

APPLICATIONS are invited for the position of HOME SERVICE ADVISER to the Great Yarmouth Group of Undertakings.

Candidates should be over 21 years of age and possess a recognised diploma in domestic science.

Preference will be given to applicants with previous practical experience in the duties concerned, which will chiefly comprise the giving of cookery demonstrations and giving advice to consumers in their homes.

The commencing salary, depending on age, qualifications and experience, is likely to be within the range of £248 to £304 per annum.

Applications, stating age and full particulars of training and experience, should be sent in the first place to J. H. Greenacre, Manager, Gt. Yarmouth Group, 40, King Street, Gt. Yarmouth.

PATENTS

KINGS PATENT AGENCY, LTD.
(Director, B. T. King, A.I.M.E., Patent Agent)
Advice Handbook, and Consultations free. 146a, Queen Victoria Street. London, E.C.4. Phone: City 6161.

REPAIRS

BRIGHT, SON & CO.
(CLERKENWELL) LTD.
FOR PUBLIC LIGHTING.
CLOCK CONTROLLER REPAIRS.
20 Northburgh St. Clerkenwell, E.C.1. Clerkenwell 7171. and at 17 & 18, Gt. Sutton St Clerkenwell, E.C.1. London Wall 0267.

PLANT FOR SALE

AVAILABLE at reasonable price, for quick sale, unused GAS GOVERNORS, G.L.C., Donkin & Jeavons, ¾ in., 1 in. and 1¼ in. Also quantity of unused ¼ in., ½ in. and 1 in. BRASS GASCOCKS, ¼ in. and ⅜ in. BRASS GAS NOZZLES, and ½ in. BRASS UNIONS.

No. 9942, *Gas Journal*, 11, Bolt Court, Fleet Street, London, E.C.4.

WALES GAS BOARD

CARDIFF UNDERTAKING.

FOR disposal, secondhand Sulphate of Ammonia Plant comprising:

2. 6-ton SATURATORS.
2. ENGINES AND COPPER BASKETS.
1. 4-ton STILL.

CONDENSERS.

And several SPARES.

Inspection by appointment.

Communications to be sent to Frank Boardman, M.INST.MECH.E., M.INST.GAS E., Engineer and Manager, Gas Offices, Bute Terrace, Cardiff.
December 12, 1950.

BOROUGH OF BEXLEY

SALE OF TWO IDEAL GAS BOILERS.

THE Council have for disposal two IDEAL GAS BOILERS, type 3G.B.10, each having a rated output of 910,000 B.Th.U. per hour. The Boilers are at the Council's Swimming Pool, East Rochester Way, Sidcup, Kent, and permission to view may be obtained from the Borough Engineer and Surveyor, West Lodge, Broadway, Bexleyheath, Kent.

Tenders, in plain sealed envelopes, bearing the words 'Tender for Gas Boilers,' must be sent to the undersigned by January 16, 1951, at the latest.

The Council do not bind themselves to accept the highest or any tender.

W. WOODWARD,
Town Clerk

Council Offices,
Bexleyheath,
Kent.

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FOR
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FIREBRICK WORK ETC
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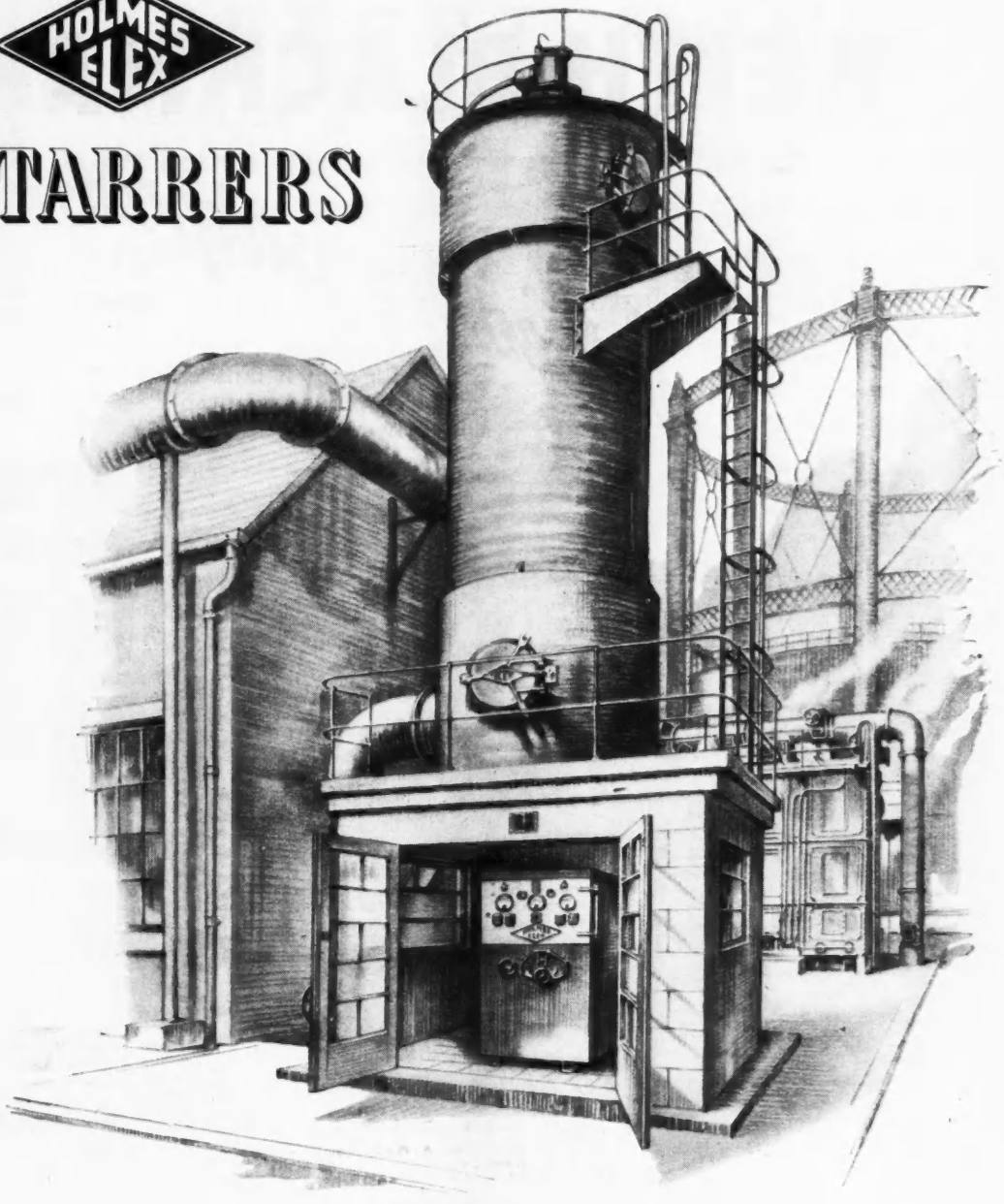

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FANS *for every purpose*

for which fans can be employed profitably in or by the Gas Industry

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WE make all types of Fans—"High Efficiency" for boosting or exhausting gas up to 3 lbs. p.s.i. and for volumes from 5,000 to 1,500,000 cfph; Cast Iron and Steel-plate "Pressure" fans for up to 2 lbs. p.s.i. air blast to furnaces, forges, water gas plants, burner equipment, etc; "Turbo" fans for applications requiring up to 6 lbs. p.s.i.; "Centrifugal" fans for draught on boiler fires to ensure economical steam production, or for cold air douche to workers in retort houses, etc.; "Centrifugal" or "Axial" fans for supplying ventilating air through ductwork; "Propeller" fans for moving air in volume for ventilating; "Propeller" fans on portable structures for cooling workers at furnace fronts; and "Tenaxe" fans for re-circulating high temperature gases and air in various types of heat treatment furnaces. WHEN you need fans for moving air or gases give us an opportunity of making practical suggestions.

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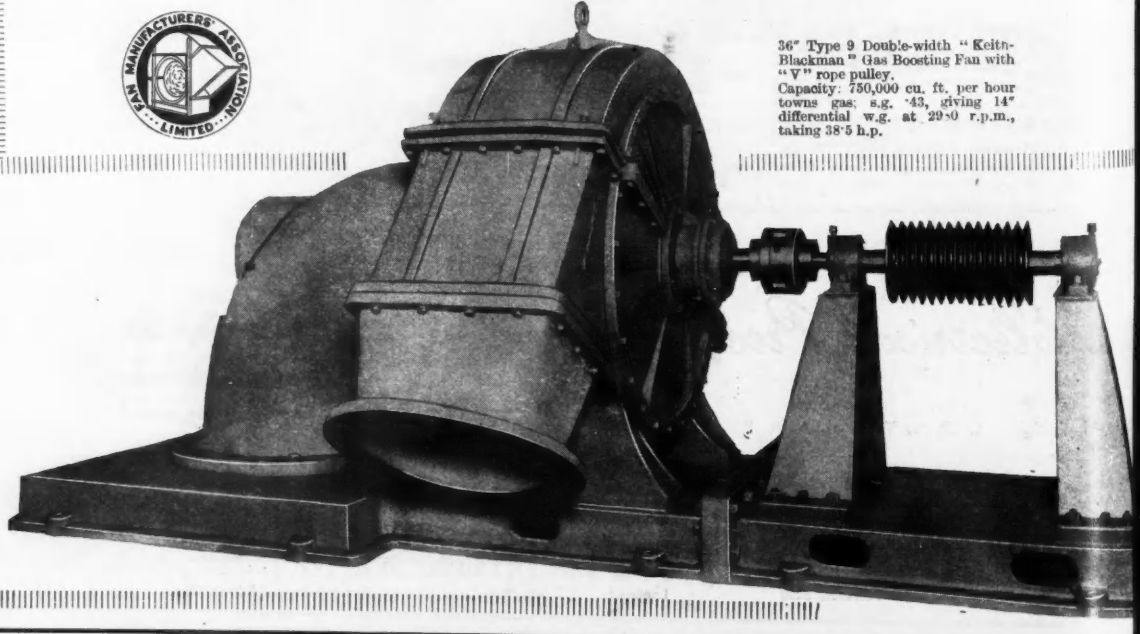
MILL MEAD ROAD, TOTTENHAM, LONDON, N.17.
TN: TOTtenham 4522. TA: "Keithblac Norphone London."

MANCHESTER, 4: 26 Corporation Street. Tel. No.: Blackfriars 4228. BIRMINGHAM, 2: 75 New Street. Tel. No.: Midland 0317-8.
LEEDS, 1: 40/41 Royal Exchange Chambers. TN: Leeds 27286. NEWCASTLE-ON-TYNE 1: 21 Mosley St. TN: Newcastle 22234.
SCOTLAND: 90 Mitchell Street, Glasgow, C1. TN: Central 7973. IRELAND: 7 Brunswick St. Belfast. TN: Belfast 21114.
SOUTH WALES: 127 Stanwell Road, Penarth, nr. Cardiff. TN: Penarth 249.

FAN MANUFACTURERS' ASSOCIATION LIMITED



36" Type 9 Double-width "Keith-Blackman" Gas Boosting Fan with "V" rope pulley.
Capacity: 750,000 cu. ft. per hour towns gas; s.g. ·43, giving 14" differential w.g. at 2950 r.p.m., taking 38·5 h.p.

Printed by STRAKER BROTHERS LTD., E.C.2. for WALTER KING, LIMITED 11, BOLT COURT FLEET STREET, LONDON, E.C.4. Wednesday December 20, 1950.

THE MODERN RETORT HOUSE

"Recent designs have shown the emergence of a distinctive style, similar to that which has been adopted in many other industrial buildings of like architectural proportions and which has been called, with some felicity, the 'industrial perpendicular'"

Editorial in the "GAS JOURNAL" of July 28, 1948, p. 205

WEST'S GAS

IMPROVEMENT COMPANY LIMITED

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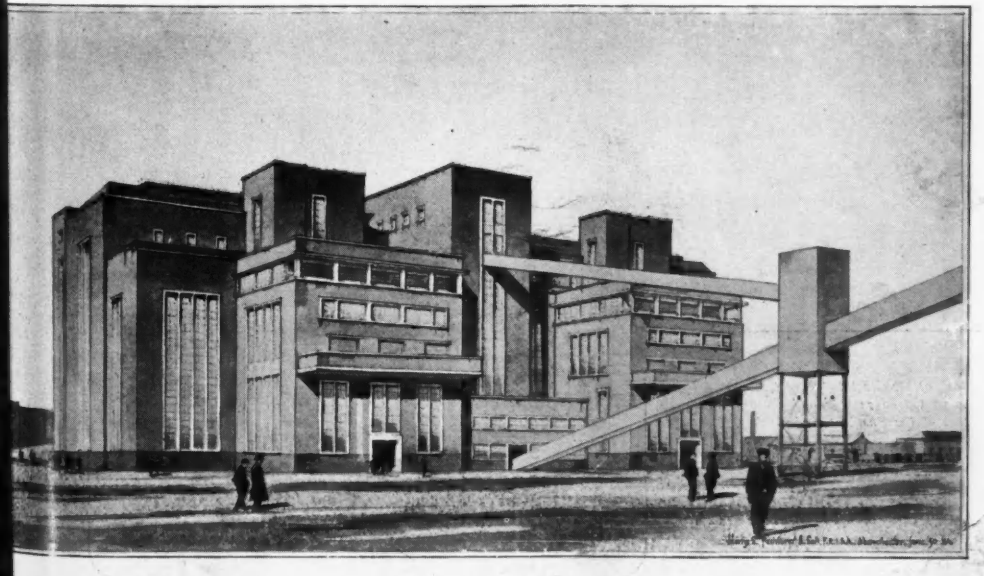
Columbia House, Aldwych, W.C. 2

SYDNEY OFFICE:
Union House, 343 George Street

NEW YORK OFFICE:
30, Broad St., New York, 4

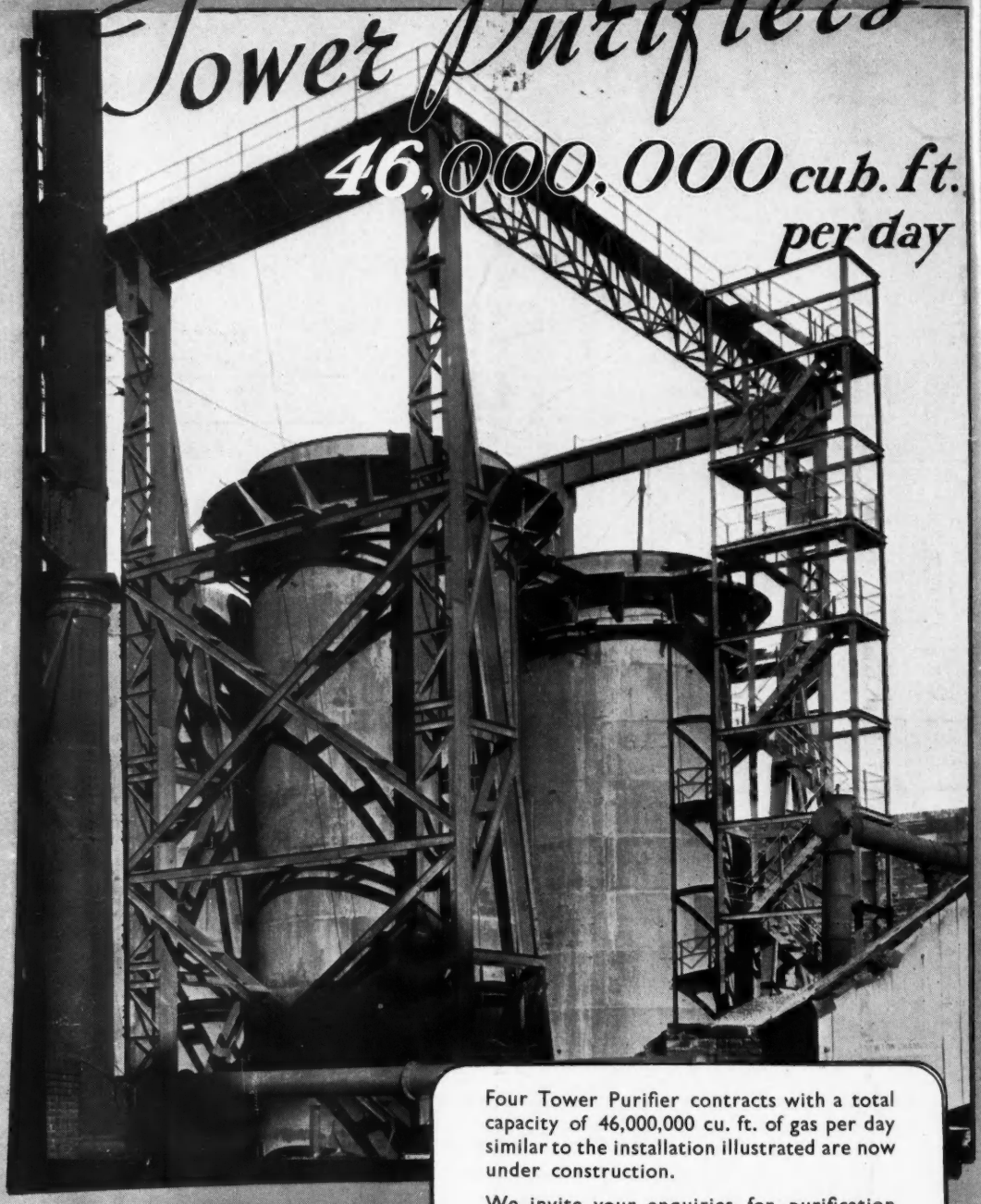
ALBION IRONWORKS · MILES PLATTING · MANCHESTER



BRISTOL—STAPLETON ROAD GASWORKS.

Tower Purifiers

46,000,000 cub. ft. per day



Photograph by courtesy of the East Midlands Gas Board shows the installation in the course of construction at the Neepsend station of the Sheffield undertaking.

Four Tower Purifier contracts with a total capacity of 46,000,000 cu. ft. of gas per day similar to the installation illustrated are now under construction.

We invite your enquiries for purification plant of this type in all cases where ground space and labour are limited.

NEWTON CHAMBERS

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NEWTON CHAMBERS & Co. Ltd., THORNCLIFFE, Nr. SHEFFIELD

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